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Editorial

Mother and Child Health - Goals 4 and 5 under MDGs

Mohsin Masud Jan
Editor

Pakistan is the worst place to be a mother in South Asia. Besides the country was ranked 147th among the 178 countries of the world considered for studies on the state of mothers and children there. Overall, Finland was ranked the best place to be a mother for the second straight year and Somalia came in last.

It was also shared though maternal mortality in Pakistan has been cut by almost half, child mortality decreased by a quarter, expected years of schooling increased by 3.3 years and gross national income per capita risen by 270 per cent over the past 15 years, these accomplishments are far less than desired and not comparable to the achievements made by other countries of the region.

It was the 15th annual report released by the organisation. Since 2000, the annual Mothers' Index has become a reliable international tool to show where mothers and children fare best, and where they face the greatest hardships, using the latest data on health, education, economics and female political participation, says the executive summary of the report. In short, the report identifies root causes for the dismal state of affairs and makes suggestions on how to improve the situation. It also guides the international community and donors to put their money where it is needed the most.

While the report discusses 178 countries, it puts special focus on crisis-hit places and concludes that half of maternal and child deaths worldwide occur here. This is something which could have been avoided with timely intervention and action. Conflicts and disasters can change situation of a country within no time and similarly corrective measures can do wonders.

As an example, the report states that "Afghanistan was the worst place to be a mother three years ago, but it is now ranked 146th due to progress in cutting child and maternal death. By contrast, Syria has slumped from 65th place in 2011 to 115th in 2014, after the conflict caused "the collapse of what had been a functioning health system, and threatens to set back progress by a generation."

The report gives an idea of the existing situation in Syria. Though the intensity is not the same, it may hold true for Pakistani women displaced by conflicts, natural and manmade disasters and sheer lack of maternal health facilities. It is discouraging to read in the report that women in Syria face difficulties in accessing prenatal, delivery and post-natal care, including lack of ambulances, few female hospital staff and frequent checkpoints and roadblocks encountered on the way to hospitals.

For this very reason, they are choosing to deliver by cesarean even if it is not needed medically. By availing this option, they can time the delivery of their babies rather than risk being in labour in an insecure context, with no ambulance, and especially risking a terrifying journey at night.

The challenges, therefore, are tough for the policymakers as service providers in Pakistan as the country has the highest number of people affected by conflict. This has been stated in a research by the Centre for Research on the Epidemiology of Disasters (CRED) which states that at least 172 million people worldwide were directly affected.

Pakistan and Nigeria had the largest numbers of people affected i.e., 28 million and 19 million respectively.

Save the Children has observed that many children are still dying from preventable causes, mothers are giving birth alone at home and children are not staying in school and called upon the federal and provincial governments and civil society to:

i) Ensure that every mother and newborn living in crisis has access to high quality healthcare, including family planning services, and breastfeeding counseling.

ii) Build the resilience of health systems to minimise the damaging effects of crises on health.

iii) Develop national and local preparedness plans tailored to respond to the specific needs of mothers, children and babies in emergencies.

iv) Ensure adequate financing and coordination to timely respond to mothers and children's needs in emergencies.

Lady Health Workers (LHWs) and community midwives as the backbone of the health department and lauds the commitment of the government.

The post-18th Amendment scenario, a lot needs to be done at the provincial level for improvement in maternal health and well-being of the new born. Only Punjab needs 15,000 community midwives to provide quality service to expecting mothers.

According to Pakistan Democratic and Health Survey (PDHS), the country will not be able to meet the goal 4 and goal 5 under the MDGs which talk about maternal morbidity and under-5 mortality. Certain areas of the country need immediate attention. For example, there are on average 260 maternal deaths per 100,000 live births but the figure in Balochistan is 785 maternal deaths per 100,000 live births. It is hard to believe but true that there is only one LHW in whole Dera Bugti.

No doubt the report highlights disturbing facts and refers to alarming figures, but it is yet to be seen how the government reacts to the situation. The very first manifestation of its resolve would be the budgetary allocation for health.

Original Article

Head Injury

Head Injury and its Consequences – a One Year Study in Karachi

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ABSTRACT

Objective: Head injuries are a major cause of mortality or disability among the youth of the nation. This study was conducted to determine the causes of head injuries in Karachi and its implications on individuals.

Study Design: Prospective observational Study.

Place and Duration of Study: This study was performed at the Emergency department of Jinnah Post Graduate Medical Centre (JPMC), Karachi from January 2013 to December 2013.

Materials and Methods: The study included 1,59,600 cases of head injury (expired or alive) brought to the emergency department of JPMC.

Results: Major Head injuries accounted for 42% of the total injury cases. Majority of the head injury cases belonged to the male segment of the society (73%) with ages ranging from 20 years – 39 years (54%). The leading cause of head injury was found to be Road traffic accidents(RTA) (43%). While analysing the outcomes of head injuries, it was found that the death rate for head injuries was 40%. This encompasses the patients that expired during or after treatment as well as the dead brought to the hospital.

Conclusion: The mortality rate due to head injuries is escalating day by day. Road traffic accidents account for majority of these cases. Steps need to be taken to control fatal head injuries by adopting effective preventive measures like traffic control and management, rapid response to accidents, effective and efficient handling of cases in hospital emergencies.

Key Words: Head Injury, Mortality Rate, Road Traffic Accidents, Karachi.

INTRODUCTION

The number of reported cases of head injuries in Karachi are increasing on daily basis. Majority of the cases endure serious repercussions. Head injuries are considered to be very expensive in terms of lives lost, efficiency losses, and health care expenses[1]. Karachi is Pakistan's cosmopolitan city and is considered to be the economic hub of the country. Unfortunately, the rate of accidents and fatalities associated with it pose a massive liability on the economic framework of the country. Head injury is considered to be serious if the brain gets affected, otherwise the injury is expected to be a simple one. Head injury can be either closed head injury (Dura remains unbroken) or open head injury (Dura is damaged or torn). Higher prevalence rate of post-traumatic epilepsy has been found in open head injury survivors in comparison to closed head injury[2]. With reference to death rate, studies show that subdural haematoma (SDH) and diffuse axonal injury (DAI) are the two worst forms of head injury. In SDH the major injury occurs to surface blood vessels whereas in DAI the key mechanical impairment occurs to the brain itself[3]. Diffuse axonal injury (DAI) is termed as a condition where damage to the brain can either be primarily functional (e.g. in concussive injuries) or structure based (e.g. in extended traumatic coma not related to mass lesions).[4, 5]

There are multiple causes of head injuries, for instance, road traffic accidents (RTA), falls, attacks, sports accidents, horse-riding accidents[6], domestic violence, etc. The causes of injuries to the head vary on the basis of age. For example, in young children, falls are found to be the major cause of head injury[7, 8]. In contrast, some studies debate that RTAs are the most common cause of head injury in children and falls hold the second place[9, 10]. Overall, road traffic accidents remain the foremost source of head injuries among all age groups [11] and are a key challenge for the concerned authorities [12].

Head injuries can be fatal resulting in the death of the patient. Studies have found that majority of the deaths in accidents have been due to head injuries[13, 14] or head trauma[15]. A study carried out in Karachi revealed that 66.4% of reported deaths were a result of head injuries[16]. Age can also influence the survival rate of major head injuries. According to a study, in case of traumatic brain injury (TBI)[17] and diffused brain swelling due to head injuries, the mortality rate is greater in the elderly population at all levels of head injury[18].

Head injuries are a major cause of mortality or disability among the youth of the nation. This study was conducted to determine the causes of head injuries in Karachi and its implications on individuals.

MATERIALS AND METHODS

This prospective study was carried out in the Emergency department of Jinnah Post Graduate Medical Centre (JPMC), Karachi. The hospital is commonly known as Jinnah Hospital. It was established in 1959 and is the largest public sector hospital in the city. On an average, JPMC handles approximately 3,80,000 emergency cases per annum. Out of these, 60% cases are of injuries and RTAs. This study was performed from a period of January 2013 to December 2013.

In this study, all the cases of head injury brought to the emergency (expired or alive) were included. Formal approval to carry out this study was taken from the hospital authorities. Consent was also taken from the patients or their relatives and they were ensured that confidentiality will be maintained and names will not be revealed.

RESULTS

It was found that out of a total of 2,28,000 injury cases, 70% (n=1,59,600) of the cases were of head injuries (both minor and major). 42% of the reported cases were of major head injury while 58% of the cases were of minor head injury (Table No. 1).

Table No. 1: Distribution according to level of head injury (n= 159600)

	No. of Cases	%age
Major Cases	67032	42.00
Minor Cases	92568	58.00
Total	159600	100.00

Most of the cases were of males, 73% (Table No. 2) with the maximum number of people in age groups of 20-29yrs (26%) and 30-39yrs (28%) (Table No. 3). The findings in Table No. 4 show the %ages of different factors responsible for head injury. Road Traffic Accidents (RTA) is the most prominent factor resulting in 43% of the head injuries. The other factor that contributes to 20% of head injuries is falls and is mostly related to children or the elderly people. Domestic violence is another prominent factor causing 15% of the head injuries. These head injuries are associated with the females of the society. Table No. 5 demonstrates the %ages of outcomes of head injuries.

Table No. 2: Distribution of cases of head injury on gender basis (n=159600)

Sr. No.	Gender	No. of Cases	%age
1.	Male	116508	73.00
2.	Female	43092	27.00
	Total	159600	100.00

According to this study, 13% of the Head injury patients were brought dead to the hospital, 27% of the people expired during treatment, 8 % of the people faced disability issues after treatment. Psychological sequalae after treatment were experienced by 2% of the patients while 49% of the patients were discharged from the hospital after successful treatment.

Table No. 3: Distribution of cases of head injury on the basis of age (N=159600)

Sr. No.	Age (years)	No. of cases	%age
1.	0-9	12768	8.00
2.	10-19	15960	10.00
3.	20-29	41496	26.00
4.	30-39	44688	28.00
5.	40-49	22344	14.00
6.	50-59	12768	8.00
7.	>60	9576	6.00
	Total	159600	100.00

Table No. 4: Distribution of cases on the basis of cause of head inury (N=159600)

Sr. No.	Cause of head injury	No. of Cases	%ages
1.	RTA	68628	43.00
2.	Falls	31920	20.00
3.	Assault	19152	12.00
4.	Domestic Violence	23940	15.00
5.	Others	15960	10.00
	Total	159600	100.00

Table No. 5: Distribution of cases on the basis of outcome (N= 159600)

Sr. No.	Causes of HI	No. of Cases	%ages
1.	Discharged on completion of treatment	79800	50.00
2.	Expired during treatment	43092	27.00
3.	Brought dead	20748	13.00
4.	Psychological sequelae	3192	2.00
5.	Disability	12768	8.00
	Total	159600	100.00

DISCUSSION

Results of the study show that majority of the head injury victims are males. This result is consistent with previously carried out researches[19, 20]. The large ratio of male sufferers has a significant negative impact on the socioeconomic conditions of the society. Males have to be in direct contact with the outside world. In most of the cases in Pakistan, they are the bread winners of their homes. In doing so, they have to travel a lot which exposes them to the brutal city traffic as well as the dangers of assaults, robbery and other attacks. In

addition, majority of the labourers and masons belong to the male segment of the society. Falls from heights or other workplace injuries are common among them. According to the age distribution chart (Table No. 3), majority of the head injury cases belonged to the age group of 20-39 years. The working class of the society belongs to this age group.

The different causes of head injury have also been determined along with their ratio of occurrence. RTA is the most dominating factor among all other causes of head injury. In case of RTAs, fatal head injuries are most common in motorcyclists who do not wear helmets. This can result in skull injuries. Base skull injuries are more serious or deadly. It should be noted that majority of RTAs result in fatal head injuries causing the death of the person[21] or severe disability[22]. The ratio of RTAs resulting in mortality in Pakistan is high according to the international organisation's standards[23] and needs to be controlled. Keeping in view these serious implications of head injuries due to road traffic accidents, they should be addressed as a public health and safety precedence[24].

The outcomes of head injuries in this study range from mortality to full recovery. The results show that 13% of the people with head injury have already expired when brought to the hospital whereas 27% died during or after the treatment. These high mortality rates are due to the sensitivity of brain and head region. This study suggest that 8% of patients experience disability after treatment. This figure is somewhat vague as the possibility is that disability symptoms occur after some time and patient does not report them to the same hospital. Due to this, it can be inferred that the results for disability are debatable. In addition, research shows that teenagers with obvious minor head injury can have disabling symptoms after many years of injury[25]. These cases remain unreported. Same is the case with reporting of psychological issues. A wide range of psychological problems occur after the treatment of head injuries that are not reported to the hospital. Especially, children take a lot of time to come out of the trauma. In some cases, the bad experience might haunt them for many years.

It is apparent that head injury, even a minor one can cause a lot of distress for the individual. Major Head injury on the other hand is mostly fatal or leads to severe disability. These serious repercussions can have damaging impacts on the social and economic conditions of a country. Especially in case of developing countries like Pakistan, the escalating mortality rates and disability rates of young males can create a huge vacuum. In order to control this hazard, policies need to be devised at all levels and areas including traffic control and management, rapid response to accidents, effective and efficient handling of cases in hospital emergencies, proactive psychological counselling of patients etc. This study holds significance as for devising a solution it is imperative to first understand the causes, intensity and outcomes of the problem[26].

CONCLUSION

The mortality rate due to head injuries is escalating day by day. Road traffic accidents account for majority of these cases. Steps need to be taken to control fatal head injuries by adopting effective preventive measures like traffic control and management, rapid response to accidents, effective and efficient handling of cases in hospital emergencies..

REFERENCES

1. Max W, MacKenzie EJ, Rice DP. Head Injuries: Costs and Consequences. J Head Trauma Rehabilitation 1991; 6(2):76-91.
2. Parikh CK. Parikh's Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology. 6th ed. New Delhi, CBS Publishers & Distributors: p.4.92-4.4.131.
3. Gennarelli TA. Head Injury in Man and Experimental Animals: Clinical Aspects. Acta Neurochirurgica Supplementum 1983; 32:1-3.
4. Gennarelli TA, Thibault LE, Adams JH, Graham DI, Thompson CJ, Marcincin RP. Diffusal Axonal Injury and Traumatic Coma in the Primate. Annals of Neurol 1982; 12:564–574.
5. Adams JH, Graham DI, Murray LS, Scott G. Diffuse axonal injury due to nonmissile head injury in humans: An analysis of 45 cases. Annals of Neurol 1982; 12:557–563.
6. King NS, Crawford S, Wenden FJ, Moss NEG, Wade DT. The Rivermead Post Concussion Symptoms Questionnaire: a measure of symptoms commonly experienced after head injury and its reliability. J of Neurol 1995; 242(9):587-592.
7. Lescohier I, DiScala C. Blunt trauma in children: causes and outcomes of head versus extracranial injury. Pediatrics 1993; 91(4):721-725.
8. Duhaime AC, Alario AJ, Lewander WJ, Schut L, Sutton LN, Seidl TS, et al. Head injury in very young children: mechanisms, injury types, and ophthalmologic findings in 100 hospitalized patients younger than 2 years of age. Pediatrics 1992; 90(2):179-185.

9. Annegers JF, Grabow JD, Kurland LT, Laws Jr ER. The incidence, causes, and secular trends of head trauma in Olmsted County, Minnesota, 1935-1974. Neurol 1980; 30(9):912.
10. Razzaka JA, Lubyb SP, Laflammea L, Chotanib H. Injuries among children in Karachi, Pakistan—what, where and how. Public Health 2004; 118: 114-120.
11. Nasrullah M, Xiang H. The Epidemic of Injuries in Pakistan - A Neglected Problem. J of Pak Med Assoc 2008.
12. Fatmi Z, Hadden WC, Razzak JA, Qureshi HI, Hyder AA, Pappas G. Incidence, patterns and severity of reported unintentional injuries in Pakistan for persons five years and older: results of the National Health Survey of Pakistan 1990–94. Public Health 2007; 7:152.
13. Mishra B, Sinha Mishra ND, Sukhla S, Sinha A. Epidemiological study of road traffic accident cases from Western Nepal. Ind J Community Med 2010; 35:115-121.
14. Tercero F, Andersson R. Measuring transport injuries in a developing country: an application of the capture–recapture method. Accident Analysis & Prevention 2004; 36(1):13-20.
15. Raza MZ, Ahmed F, Ahmed A, Ghani A, Malik L, Siddiqui UA. Title of the Study: A Retrospective Analysis of the Pattern and Severity of Injuries in Victims of Road Traffic Accidents in Karachi, Pakistan during 2010-2011. Emerg Med 2013; 3(3):1-5.
16. Mirza FH, Hassan Q, Jajja N. An autopsy-based study of death due to road traffic accidents in metropolis of Karachi. Journal of Pakistan Medical Association 2013; 63(2):156-160.
17. Mosenthal AC, Lavery RF, Addis M, Kaul S, Ross S, Marburger R, et al. Isolated traumatic brain injury: age is an independent predictor of mortality and early outcome. Journal of Trauma-Injury, Infection, and Critical Care 2002; 52(5):907-911.
18. Aldrich EF, Eisenberg HM, Saydjari C, Luerssen TG, Foulkes MA, Jane JA, et al. Diffuse brain swelling in severely head-injured children. A report from the NIH Traumatic Coma Data Bank. J of Neurosurg 1992; 76(3):450-454.
19. Ghaffar A, Hyder AA, Masud TI. The burden of road traffic injuries in developing countries: the 1st national injury survey of Pakistan. Public Health 2004; 118(3):211-217.
20. Gururaj G. Alcohol and Road Traffic Injuries in South Asia: Challenges for Prevention. Journal of the College of Physicians and Surgeons--Pakistan JCPSP 2004; 14(12):713-718.
21. Mohan D. Evidence-based interventions for road traffic injuries in South Asia. Journal of the College of Physicians and Surgeons—Pakistan JCPSP 2004; 14(12):746-747.
22. Khan I, Khan A, Aziz F, Islam M, Shafqat S. Factors Associated with Helmet Use among Motorcycle Users in Karachi, Pakistan. Acad Emerg Med 2008; 15(4):384-387.
23. World Health Organization: Global status report on road safety: Time for action. (Online). 2010.
24. Ameratunga S, Hijar M, Norton R. Road-traffic injuries: confronting disparities to address a global-health problem. The Lancet 2006; 367(9521): 1533-1540.
25. Colantonio A, Dawson DR, McLellan BA. Head injury in young adults: long-term outcome. Archives of Physical Medicine and Rehabilitation 1998; 79(5):550-558.
26. Jennet B, Macmillan R. Epidemiology of Head Injury. Br Med J 1981; 282:101-104.

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Original Article

Hanging and Strangulation

Position of the Knot in Hanging and Strangulation in Asphyxial Deaths in Medico-Legal Autopsies in Lahore

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ABSTRACT

Objective: This study was carried out to find out the position of the knot in all the asphyxial deaths due to hanging and ligature strangulation.

Study Design: Retrospective study.

Place and Duration of Study: This study was carried out at Forensic Medicine Department KEMU, Lahore, during the period from Jan. 2006 to Dec. 2008.

Materials and Method: Out of total 2979 medico-legal autopsies, 220 cases of fatal compression to the neck were selected. The autopsy reports, police documents and hospital records were studied.

Results: Out of total autopsies compressive trauma to the neck was in 220 cases (7.39%). Hanging was the commonest cause 42.27%, ligature strangulation 29.09% and manual throttling 23.64%. The manner of death out of 104 cases of hanging was 68.50% (68 cases) with predominance of males (Male/Female ratio 2.78:1). 3rd decade showed higher incidence in males than the females which were more in 2nd decade. No hanging was seen in the 1st decade. The strangulation was common in 2nd, 3rd and 4th decades of life. Males showed higher incidence than females in hanging in 3rd and 4th decade. Females showed higher incidence in 2nd, 3rd and 4th decades in ligature strangulations than males. In throttling males showed higher incidence in 3rd decade than females in 4th decade. The homicidal deaths were 57.27%, suicidal 30.90% and undetermined were 11.82%. Ligature strangulation and throttling were the methods used in homicidal manner (57.27%) while hanging was used for suicide (30.97%). In hanging the position of the knot was at occiput in 62.50% cases and 23.08% had lateral position. In ligature strangulation 78.13% showed the knot on the front and 21.87% lateral.

Conclusion: In hanging, which is a common method of suicide in our country, the knot was at occiput in 65 cases (62.50%), on right or left lateral in 24 cases (23.08%) and in none of the case was on the front. While in ligature strangulation, in 50 cases (78.13%) it was on the front, in 14 cases (21.87%) on right or left side and in none of the case it was on the front.

Key Words: Asphyxia, Hanging, Ligature Strangulation

INTRODUCTION

Neck transmits important vital structures from head to body, like major blood vessels, nerves, wind pipe and esophagus. So this region is most vulnerable to injuries and most important of these injuries is mechanical compression to the neck. This causes mechanical asphyxia and most common means used to do this is by ligature or manual compression. In hanging the body weight acts as a constricting force[1]. This mechanical compression can also be achieved by direct blow on neck, arms lock, accidental falls on to the neck and accidental entanglement in cords[2].

As a consequence of mechanical compression the asphyxia will develop. The outcome will depend upon the effects of the structures involved, individually or in total and method & force applied. Occlusion of the jugular veins will occur with only2 kg of weight; and it will cause obstruction to return of blood to the heart and will appear as cyanosis, congestion and petechiae. Carotids arteries needs 3.5 kg and will cause cerebral ischemia. Pressure on carotid bodies will cause stimulation of baro-receptors in the carotid sinus lying in the internal carotid arteries, and will cause sudden cardiac arrest by stimulation of vagus nerve. The obstruction to the respiratory passages can be achieved with elevation of larynx and pushing the base of tongue against the posterior pharyngeal wall. Due to rigid structures of wind pipe it is difficult to occlude the airways, but 15 kg of tension can do that. Direct pressure on the larynx can also cause the fractures of hyoid and thyroid cartilages.[2, 3, 4, 5,6]

Whatever mechanism is used to achieve mechanical asphyxia, the reduction in O_2 level will result in tissue anoxia leading to endothelial damage, capillary dilatation, increased permeability and stasis of blood. This will appear as cyanosis, congestion, petechial haemorhage oedema and serous effusion. This

reduction in circulating blood volume will set in a viscous cycle of more anoxia and so on.

MATERIALS AND METHODS

All the medico- legal autopsies which had been conducted in the Department of Forensic Medicine & Toxicology KEMU Lahore during Jan-2006 to Dec-2008 were studied. The autopsy reports, police documents and hospital records were scrutinized. The asphyxial death cases were studied and analyzed for age, sex, type of compression, manner of death, level in relation to thyroid cartilage, number of turns, fracture of hyoid bone and position of the knot. All those cases where the cause of death was hanging or ligature strangulation were included while other cases were excluded in which the trauma to the neck was present but the cause of death was other than hanging or strangulation.

RESULTS

Out of total 2979 medico-legal autopsies carried out during the three years study period of 2006-2008 in the Department of Forensic Medicine & Toxicology, 220 (7.38%) cases were due to compression of neck. (Table No. 1).

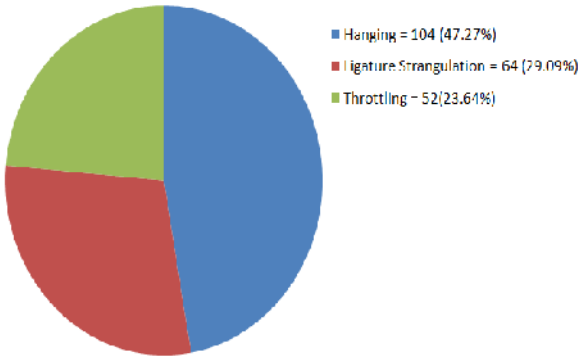
Table No. 1 Causative Agent (2979 cases)

	Total	%age
Blunt Means	403	13.52
Sharp Means	256	8.5
Fire-arms	1285	43.13
Poisoning	74	2.48
Burns	50	1.68
All Asphyxial Deaths	220	7.38
Electrocution	19	0.64
Drowning	17	0.57
Bomb Blast	65	2.18
Natural	347	11.65
Un-Determined	213	7.15
Total	2979	100.00

Types of Neck Compression:
Three types of neck compression means were seen commonly in our study, out of these 220 cases of asphyxial deaths, the cases of hanging were 104 (47.27%) and 64 cases (29.09%) were those of ligature strangulation. (Table No. 2) (Graph 1).

Table No.2: Types of Neck Compression (220 cases)

Types	No. of Cases	%age
Hanging	104	47.27
Ligature Strangulation	64	29.09
Throttling	52	23.64
Total	220	100.00



Graph No.1: Types of neck compression

Age and Sex Distribution: The most common age group involved was between 21-30 years (35.91%) and next to it was between 31-40 years (25.91%). Next involved age group was between 11-20 years (17.27%). Total of 144 (65.45%) male cases were seen out of all 220 asphyxial deaths, and females were 76 (34.55%). (Table No. 3).

Table No. 3: Age and Sex Distribution in 220 cases

Years	Male	Female	Total	%age
< 1	-	-	-	-
1-10	2	3	5	2.27
11-20	23	15	38	17.27
21-30	59	20	79	35.91
31-40	36	21	57	25.91
41-50	9	6	15	6.82
51-60	10	7	17	7.73
>60	5	4	9	4.09
Total	144 (65.45%)	76 (34.55%)	220	100.00

Manner of Death: Manner of death is either natural or un-natural. Un-natural in our study include homicide, suicide or un-determinable death in which the exact cause of death could not be ascertained due to natural or acquired limitations. No case of accidental asphyxial death was reported during the period of study.
The distribution according to manner of death showed that, incidence of homicide was 57.27% (126), suicidal 30.90% (68), while 11.82% (26) cases remained un-determined. Male to female ratio was 2.15:1 in homicidal deaths, 2.77:1 in suicidal and 1.6:1 in un-determined deaths. (Table No. 4)

Position of Knot: The knot was present on occipital position in 65 cases (62.50%) and it was on lateral right or left positions in 24 cases (23.08%) and in ligature strangulation in 50 cases (78.13%) the knot was on front and in 14 cases (21.87%) it was on lateral right or left . (Table No. 5).

Table No. 4: Manner of Death in All Asphyxial Deaths (n=220)

Age (Years)	Total	Homicide M/F Ratio 2.15:1			Suicide M/F Ratio 2.77:1			Un-Determined M/F Ratio 1.6:1		
		M	F	Total	M	F	Total	M	F	Total
<1	0	0	0	0	0	0	0	0	0	0
1-10	5	2	3	5	0	0	0	0	0	0
11-20	38	8	6	14	5	9	14	7	3	10
21-30	79	36	11	47	20	06	26	4	2	6
31-40	57	20	14	34	16	02	18	3	2	5
41-50	15	8	2	10	4	01	5	0	0	0
51-60	17	6	3	9	5	0	5	0	3	3
>60	9	6	01	7	0	0	0	2	0	2
Total	220	86	40	126 (57.27%)	50	18	68 (30.91%)	16	10	26 (11.82%)

Table No. 5: Position of knot in hanging

Position of knot	Hanging	Front	-	-
		Occiput	65	62.50%
		Lateral (right or left)	24	23.08%
	Ligature Strangulation	Front	50	(78.13%)
		Occiput	-	-
		Lateral (right or Left)	14	(21.87%)

DISCUSSION

Incidence of Death: Our study showed that fatal compression to the neck caused 220 deaths out of 2979 medico-legal autopsies carried out at the Department of Forensic Medicine & Toxicology K.E.M.U. Lahore with an incidence of 7.39% and 89.45% of all asphyxial deaths. This incidence is much higher than reported by 1.6%[7], 1.75%[8], and 1.88%[9] of all asphyxial deaths. And it was 2.94%[10] of all deaths 24.53% of all asphyxial deaths, 5%[11] of all deaths and 82% of asphyxial deaths, and 1.17%[12]& 12.4%[13] of all and 5.5% of all deaths but lower than 15.7%[14] in Edirne Turkey.

Type of Neck Compression: The incidence of hanging is the highest 47.27% (n=104), next is ligature strangulation 20.09% (n=64) and throttling is 23.64% (n=52). These values are comparable with (hanging 57%, strangulation 21%, and throttling 18%) [9], (hanging 61.17%, ligature strangulation 21.19% and throttling 17.64%) [8], (hanging/ligature strangulation 80.7% and throttling 19.3%) [7], (hanging/ligature strangulation 85% and throttling 6%) [15], (ligature strangulation 12.4%) [13], (ligature strangulation 19.23%, throttling 46.15%) [10], (hanging 41.8%, ligature strangulation 2.9% and throttling 2.3%) [14], (hanging 69%) [11].

Age and Sex Distribution: The highest incidence of all neck compression deaths, hanging, ligature strangulation and throttling is seen in the 21-30 years of age group. This is comparable with the previous studies also 57% [11], 3rd decade [12], average of 41.9 years [14]. Bowen[16] has shown highest incidence of hanging in 50-59 years of age. Guarner & Hanzlick[17] mentioned 31 years of age showing highest incidence in USA.

Male/Female Ratio: In our study male/female ratio in hanging is 2.25:1, ligature strangulation 2.05:1 and in throttling 1.26:1. So males have shown higher incidence in all the three asphyxial deaths.

In hanging males were 69.23%, which is higher than females having 30.76%. This is comparable with those of 83.9% males of Azmak[14], 2.7:1 (males 73.07% and females 26.92%) of Bashir MZ[9] et al.In ligature strangulation and throttling Bashir MZ[9] has shown 58.9% males and 41.02% females. Azmak D[14] has quoted 1:3 for strangulation and 1:2 for throttling, and Srivastava AK[10] had shown 30.77% males and 69.23% females, giving higher incidence in females than males.

Manner of Death: The homicidal deaths in our study were which shows higher incidence than that of Bashir MZ[9] 45.05% but lower than that of Demirci S[13] 85%. Suicidal 30.90% in our study is lower than Bashir MZ[9] 45.45% and Azmak D[14] 47%. It is higher than that of Demirci S[13] 15%.In hanging the suicidal incidence in our study was 65.38%, which is lower than that of Bashir MZ[9] 86.53%. Homicidal showed 9.62% which is also higher than 3.84%[9]. But lower than that of Bowen DA[16], which is 95%.There was no case of accidental hanging; however Bowen DA[16] reported 5% of auto-erotic accidental asphyxial deaths.

Position of Knot: In 65 cases (62.50%), the knot was present at occiput, which is comparable with the findings of Azmak D[12] narrating 66% on occiput in hanging and 88.7% on the chin in ligature strangulation. In 24 cases (23.08%), it was on lateral side, either right or left. Whereas in ligature strangulation, in 50 cases

(78.13%) the knot was on front and in 14 cases (21.87%) it was on lateral right or left. Our findings are also comparable with those of Bawon DA.[16] et al and Sharma BR[15] et al.

CONCLUSION

Hanging remains the most preferable method of suicidal asphyxial deaths and ligature strangulation being the next in number in homicidal asphyxial deaths. In hanging, the position of the knot is typically at the occiput in most of the cases, and similarly in homicidal strangulation the knot is on the front in majority of the cases.

REFERENCES

1. Vanezuis R. The Pathology of Neck. 1st ed. Butterworth & Co London;1989.p.56-75.
2. Knight B. Forensic Pathology. 2nd ed. Amold: London;1996.p.90.
3. Shepherd R. Simpson Forensic Medicine. 12th ed. Arnold:London;2003.p.97.
4. Gordon I. Shapiro HA. Eds. Forensic Medicine. A guide to Principles. 2nd ed. Churchill Livingstone: London;1984.p.102-118.
5. Parikh KC. Parikh's Text Book of Medical Jurisprudence, Forensic Medicine and Toxicology. 7th ed. CBS Publishers: India;2006.p.3,34-3,57.
6. Awan RN. Principles and Practice of Forensic Medicine. 1st ed. M Ishtiaq Printers;2009.p.106-12.
7. Rehman IU, Aziz KK, Kaheri GQ, Bashir Z. The Fracture of Hyoid Bone in Strangulation. A review Annals 2000; 6(4):396-98.
8. Malik SA, Aziz K, Malik AR, Rana PA. Fracture of Hyoid Bone: An indicator of death in strangulation. Pak Postgraduate J 1999;10(4): 112-115.
9. Bashir MZ, Malik AR, Malik SA, Rana PA, Aziz K, Chaudhry MK. Pattern of Fatal Compression of the Neck. A five Year study in Lahore. Annals 2000; 6(4):396-98.
10. Srivastava AK, Gupta SMD, Tripathi CB. A study of Fatal Strangulation Cases in Varanasi (India). The Am J of Forensic Med & Pathol 1987; 8(3): 220-24.
11. Hussain SM, Mughal MI, Din SZ, Baluch NA, Bukhari SMZ, Malik S. et al. An autopsy study of Asphyxial Deaths. Med. Forum 2008;19(4):27-30.
12. Verma SK, Lal S. Strangulation deaths during 1993-2002 in East Delhi (India). Leg Med Tokyo 2006;8(4):1-4.
13. Demirci S, Dogan KH, Erkol Z, Gunaydin G. Ligature Strangulation Deaths in The Province of Konya (Turkey). J Forensic Leg Med 2009; 16(5):248-52.
14. Azmak D. Asphyxial Deaths. A Retrospective Study and Review of the Literature. Am J of Forensic Med and Pathol 2006; 27(2): 134-144.
15. Sharma BR, Harish D, Sharma A, Sharma S, Singh H. Injuries to The Neck Structures in Death due to Constriction of Neck, with a special reference to Hanging. J Forensic Leg Med 2008;15(5):298-305.
16. Bawon DA. Hanging-A review. Forensic Sci Intl 1982; 20:247-49.
17. Demirci S, Hanzlick R. Suicide by Hanging. The Am J of Forensic Med and Pathol1987;8(1):23-26.

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Original Article

Screening of Beta Thalassaemia

The Prevalence and Antenatal Screening of Beta Thalassaemia Trait in Pregnancy by naked Eye Single Tube Red Cell Osmotic Fragility Test

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ABSTRACT

Objectives: To evaluate the prevalence of Beta Thalassaemia Trait (BTT) detected by Naked Eye Single Tube Red cell Osmotic Fragility Test (NESTROFT). We also highlight the validity and importance of this test for antenatal screening of BTT to prevent incidence of Beta Thalassaemia major in our community as well as differentiating the BTT, BTT with coexisting iron deficiency anemia and only iron deficiency anemia in pregnancy.

Study Design: Experimental and observational study.

Place and Duration of Study: This study was conducted at Pathology and Gynae-Obs Out Patient departments of Peoples University of Medical & Health Sciences for Women (PUMHSW) Hospital, Shaheed Benazirabad from February 2013 to February 2014.

Materials and Methods: Total 461 pregnant women with their age ranged between 18 – 42 years including multigravida and primigravida as well as first trimester to second trimester of pregnancy were selected. The family history of thalassaemia and history of cousin marriages were noted. 4ml of anti-coagulated whole blood and 2ml of clotted blood samples were collected from each pregnant women and sent to the pathology department for NESTROFT testing, and later tested for Complete Blood Count (CBC) along with peripheral blood smear stained with Leishman's stained on the 2 to 3 slides as enhanced tool for BTT case finding while estimation of serum Ferritin were done from the clotted blood sample. Screening for BTT was done on Naked Eye Single Tube Red cell Osmotic Fragility Test (NESTROFT) with 0.36% freshly prepared saline. The diagnosis of BTT was confirmed on automated Hemoglobin Electrophoresis at cellulose acetate alkaline pH from the 2ml of clotted blood in NESTROFT positive cases.

Results: Out of total 461 pregnant women with their mean age 30 $\pm$ 12, 30 were diagnose with BTT, out of 18 (54.5%) women were married with their cousins, neither the family history of Beta thalassaemia major was present nor husband of any women was carrier of thalassaemia. NESTROFT showed sensitivity, specificity, positive and negative predictive values and efficiency of 84%, 98.6%, 82%, 99% and 93% respectively. The laboratory parameters such as The mean values of hemoglobin g/dl, RBC count millions/cmm, PCV %, MCV fl, MCH pg, MCHC g/dl among these subjects were 11.9 g/dl, 4.5 millions/cmm, 82 fl, 38.7%, 26.9 pg, 33.2 g/dl respectively were showed in cases of BTT and co-existent iron deficiency anemia in pregnancy. Coexistent iron deficiency anemia did not preclude diagnosis of beta thalassaemia major.

Conclusion: The prevalence of BTT in pregnant women is 6.5% and NESTROFT is a valuable, cost effective screening test for beta thalassaemia trait in pregnancy with cousin marriage ratio of 54.6%. The significant difference of hematological parameters in BTT alone, BTT coexistence iron deficiency anemia and iron deficiency anemia alone were founded in our study.

Key Words: Prevalence, Beta thalassaemia trait (BTT), Naked eye single tube red cell osmotic fragility test (NESTROFT), prenatal screening, and coexistent iron deficiency anemia.

INTRODUCTION

The thalassaemia are monogenetic autosomal recessive disorders of hemoglobin synthesis characterized by complete lack or reduced synthesis of either alpha chain or beta chain that are manufactured by genes located on chromosomes 16 & 11 respectively and each chain combine with heme of the hemoglobin molecules, Beta thalassaemia major among the thalassaemia in children causes morbidity due to severe type of hemolytic anemia required blood transfusion that increases the burden of health care delivery system in developing countries[1]. Currently 217 causative molecular defects have been described in the beta globin gene causing beta thalassaemia, about 20 genetic mutations account for 90% of beta globin genes in the world and in Pakistan 11 different beta globin genes due to the high ratio of consanguineous marriages in different ethnic groups such as IVS 1-5 (G →C), 619bp del, IVS 1-1 (G → T), Fr 8/9 (+G), Fr 41/42 (-CTTT), CD 30 (G → A), CD 15 (G -> A), IVS II-I (G -> A), Fr 16 (- C), Cap +1 (A -> G) and CD 5 (-CT) are detected[2]. The

hematological consequence of beta thalassaemia major is life threatening severe type of anemia caused by diminished hemoglobin synthesis as a result of decreased beta chain synthesis of hemoglobin and ineffective erythropoeisis due to the excessive alpha chain that impair the normal erythropoiesis on one hand and on the other hand excessive alpha chain aggregates to form toxic products leading to hemolysis of Red Blood Cell[3]. The clinical and laboratory findings of Beta thalassaemia major includes, severe anemia that appear in infancy and childhood at the age of 6 months to 2 years than fetal hemoglobin change into the adult hemoglobin, growth retardation due to the bone deformity, hepatospleenomegally, iron overloading and suseptability to infections are other complication of disease, the diagnosis of beta thalassaemia major depends upon complete blood examination, estimation of fetal hemoglobin, adult hemoglobin A and hemoglobin A2 by hemoglobin electrophoresis as well as high performance liquid chromatography and DNA analysis of fetal cells during pregnancy[4]. The treatment of thalassaemia major remains a source of misery, burden and mostly disappointing; hence emphasis must shift from the treatment to the prevention of such births of children with beta thalassaemia major in the future, the most effective and feasible approach for solving this problem includes population education, mass screening, genetic counseling and prenatal diagnosis, is the only effective way of coping successfully with such a disease[5]. The Naked Eye Single Tube Osmotic Fragility Test (NESTROFT) has been variably looked upon as a simple, cheap, rapid, objective test with sensitivity as high as 99.8% in detection of thalassaemia carriers in pregnancy as a prenatal screening in areas of high prevalence of this disease[6]. All pregnant women attending antenatal clinics can be screened for BTT at the time of their first antenatal visit. To identify pregnancies at risk of producing children with Beta thalassaemia major by testing there husbands for the identification of BTT and mild to moderate degree of hypochromic microcytic anemia is encountered in about 65-85% of carriers of BTT with or without iron deficiency anemia and iron therapy in BTT cases causes harmful effects because of iron overloading, therefore it is necessary to differentiate these cases to avoid unnecessary iron supplementation in pregnant women with carrier state of beta thalassaemia[7]. Hence, in our study we aim to evaluate prevalence and antenatal screening of beta thalassaemia trait by NESTROFT that is suitable screening procedure for carriers of beta-thalassaemia trait among antenatal mothers attending the gynae-obs department of our hospital. This study also highlights the differentiation of iron deficiency anemia alone, coexistence with BTT and BTT alone by the various hematological parameters among the pregnant women because unnecessary iron therapy in BTT cases causes iron overloading.

MATERIALS AND METHODS

A. Inclusion criteria

1. An experimental and observational study was conducted at Gynae-obs Out Patient and pathology departments of PUMHS from February 2013 to February 2014 on a samples of 461 pregnant women with all the three trimester of pregnancy and primigravida as well as multigravida coming from rural areas of districts Shaheed Benazirabad and other neighboring districts were selected. The ages of women range between 18 & 40 years and out of 461, 30 were diagnosis with BTT and 18 were married with their cousins hence ratio of cousin marriage was 56.6, the awareness regarding the thalassaemia was created by distributing pamphlets to the each pregnant lady and detailed history was filled about the any family member present with beta thalassaemia major, history of cousin marriages neither any women gives history of abortion nor any history of blood transfusion.

2. The six ml of venous blood was taken from all these subjects, 3 ml of blood out of 5 ml was well mixed in quantity of 1.5 $\pm$ 0.2 mg/ml anticoagulant such as Ethylene Diamine Tetracetic acid from these and remaining 2ml blood was allowed to clot in separate tube. All the coagulated and anti coagulated samples of blood were send to the diagnostic and research laboratory in pathology department of PUMHS for the screening of beta thalassaemia trait. The Nestroft was done using 0.36% buffered saline and hematological parameters such as hemoglobin g/dl, RBC indices (PCV, MCV, MCH & MCHC) were analyzed by Nihon kohden, estimation of hemoglobin A2 level in NESTROFT positive cases was carried out by hemoglobin electrophoresis on cellulose acetate membrane using TEB buffer, pH 8.6. Hb A2 estimation was done following elution after electrophoresis on cellulose acetate, TEB buffer, pH 8.9 for this test in these subjects within two hours of collection of anti clotted blood samples. Two to three peripheral blood smears were also made and stained by Leishman's stain in each case. Serum ferritin was done by the principle of microplate immunoenzymometric assay using ACCUBIND ELISA Microwells (Monobind Inc. Product Code: 2825-300) in suspected cases of heterozygous state of beta-thalassaemia from the clotted blood samples. A cut off Hb A2 level of $\geq$ 3.6% was used for diagnosing thalassaemia trait and serum ferritin level of <10ug/dl was taken as cut off of iron deficiency. The results were analyzed statistically by using SPSS version 16.0.

The NESTROFT was done with freshly prepared 0.36% buffered saline from stock solution that was prepared in the form of 10% buffer saline at pH 7.4 with NaCl 90g, anhydrous Na_2HPO_4 13.65G and NaH_2PO_4 2.43g (can be stored in well stoppered bottle in refrigerator for 6 months). Working buffer was prepared fresh by putting 3.6ml of stock solution for 100 ml buffer (by adding

distilled water). For NESTROFT testing, 20uL volume of EDTA anti-coagulated whole blood was pipetted out into a clean glass test tube (10x100mm) containing 4 ml of 0.36% freshly prepared buffered saline solution. Contents of tubes were mixed and left at room temperature for 20 minutes. After mixing again, tubes were read in a standardized light against sharp black lines drawn behind the tube at a standardized distance. The results were recorded as "Negative" with clearly visible lines and "Positive" when lines were not visible and "Doubtful" when partially visible lines seen. The doubtful cases were also interpreted as positive result. The preliminary NESTROFT test result cards were issued to all participating subjects. Subjects with positive NESTROFT were counseled for follow up confirmation of BTT on Hb Electrophoresis at 8.6 Ph ($HbA_2 > 3.5$ %).

B. Exclusion criteria: The patients with liver diseases and with other type of hemoglobinopathies were excluded from the study.

RESULTS

The characteristic features of 461 pregnant women were as follows. The mean age of these women was 26.5 ± 21.5 years while cousin ratio of 56.6 among them was observed. The multigravida and primigravida were 302 (65.5%), 159 (34.5%) respectively while gestational ages of these pregnant women such as 101 (22.0%) in first trimester, 139 (30.1%) in second trimester, 221 (47.9%) in third trimester was noted. The significance difference of values of hematological parameters such as mean values of hemoglobin g/dl, Red Blood Count millions / cmm, Packed Cell Volume %, Mean Cell Volume fl, Mean Cell Hemoglobin pg, Mean Cell Hemoglobin Concentration g/dl, Red Cell Distribution width %, and microscopic examination of peripheral blood smears revealed a fairly hypochromic microcytic red cell picture with presence of target cells among the 18 pregnant women with BTT, 12 with BTT coexistence with iron deficiency anemia (IDA) respectively. Serum Ferritin level <15ug/dl was taken as cut off for IDA. Ferritin levels were found normal in BTT cases. Out of 461 samples, NESTROFT was positive in 30 and negative in 431 samples. Out of all NESTROFT positive cases, 24 were true positive (HbA2 > 3.5) while remaining 6 were false positive and false negative were observed in 5 subjects only. Sensitivity 89%, specificity 98%, positive predictive value 81% and negative predictive value 99% while efficiency of test was calculated to be 98.6% and overall prevalence of BTT among the pregnant women was 6.5 while coexistence iron deficiency anemia does not cause any problem in this study.

Table No.1: The characteristic features among the total screened prenatal mothers N = 461

Sr. No.	Characteristics	Total
1	Mean age	30 ± 12 years
2	Consanguinity Out of 30 women with BTT, 18 were married with their husband	56.6 %
3	**Gravida** Multigravida Primigravida	 302 (65.5%) 159 (34.5%)
4	**Gestational age** First trimester Second trimester Third trimester	101 (22.0%) 139 (30.1%) 221 (47.9%)
5	Family history of thalassemic child	Nil
6	Carrier state of Thalassaemia among the husbands of pregnant women	Nil
7	Prevalence rate of BTT	6.5%

N = Number of screened prenatal mothers

Table No.2: Hematological parameters among the screened prenatal mothers with the BTT and BTT coexistence with iron deficiency anemia and iron deficiency anemia. N = 461

Hematological parameters	BTT with coexistence IDA N=12	Beta Thalassaemia Trait N=18	Iron deficiency anemia N=301
Hemoglobin g/dl	10.7 ± 2.6	11.2 ± 2.4	11.9 ± 2.7
PCV %	31.3 ± 8.1	31.1 ± 6.7	35.1 ± 8.5
RBC count million/cmm	4.2 ± 0.3	5.5 ± 0.8	5.5 ± 0.9
MCV fl	68.2 ± 7.5	66.3 ± 6.8	82 ± 7.5
MCH pg	22.5 ± 3.1	21.2 ± 2.9	24.3 ± 1.9
MCHC g/dl	29.8 ± 3.4	31.5 ± 3.5	33.8 ± 2.1
RDW %	15.9 ± 2.8	14.1 ± 0.4	14.2 ± 0.3
PBS	Microcytic hypochromic Red Blood Cells (RBC) with presence of target cells.		

N = Number of screened prenatal mothers

Table No.3: Nestroft results, hemoglobin A2 and Serum ferritin levels among the screened prenatal mothers with BTT, Iron deficiency anemia and coexistence BTT with iron deficiency anemia. N = 203

Laboratory Parameters	BTT N = 18	Coexistence IDA with BTT N = 12	Iron Deficiency Anemia N = 301
NESTROFT Positive	True 14 False 4	True 10 False 2	11 (3.6%)
Negative	True 456 False 5		290 (96.4%)
Hemoglobin A2 %	5.2 ± 1.6	4.9 ± 1.3	1.4 + 0.5
Serum Ferritin	15.2 ± 3.5ng/dl	8.1 ± 1.1ng/dl	7.9 ± 0.9 ng/dl

N = Number of screened pregnant women
BTT = Beta Thalassaemia Trait

BTT with coexistent IDA = Beta Thalassaemia Trait with Iron Deficiency Anemia
IDA = Iron Deficiency Anemia
SD=Standard Deviation

Table No.4: Sensitivity, Specificity, positive and negative predictive values and efficiency of nestroft in prediction of BTT among the screened prenatal mothers.

Sensitivity (%)	Specificity (%)	Positive predictive values (%)	Negative predictive values (%)	Efficiency of test (%)
84%	98.6%	82%	99%	93%

DISCUSSION

According to the world health organization report, about 7% pregnant women were carrier of BTT and 1% couples were at risk for thalassaemia major among their coming off springs through out the world. Abdullah KN et al stated that risk factor such as consanguinity increasing the frequency of thalassaemia in Pakistan, hence prevention plays key role rather than the treatment of beta thalassaemia major that could be health burden on the health care delivery system of our country. They also founded safety of chorionic villus sampling as a diagnostic tool for pre-natal diagnosis in selected patients for the DNA analysis of fetal cells. Study conducted by Ou. Z et al[10] and Atulshrivast et al[11] detected elevated hemoglobin A2 as marker of beta thalassaemia trait in pregnancy by hemoglobin electrophoresis and high performance liquid chromatography. In contrast to these studies in which diagnosis of beta thalassaemia trait was made by expensive, time consuming required sophisticated instrument and expertise, Hafeez M et al[12] recommended NESTROFT for screening of beta-thalassaemia trait in pregnancy as a antenatal screening where there is high prevalence and constrained resources. They also founded similar ratio of cousin marriages in the various ethnic groups of peoples of South Punjab. In our study, total 461 antenatal mothers underwent NESTROFT, complete blood count, RBC indices and hemoglobin electrophoresis for estimation of hemoglobin A2 level among the NESTROFT positive cases. NESTROFT was true positive in 24 out of 30 thalassaemia carriers, 6 false positive, 5 false negative and 431 subjects were true negative, hence in our study, a 6.5% prevalence of beta thalassaemia carrier state among antenatal women was founded while specificity, sensitivity, predictive positive and negative values of NESTROFT among the total 461 antenatal mothers were 80 to 89.9% and ratio of cousin marriages such as 56.6% was founded among the pregnant women in our study. The same prevalence of BTT among the pregnant women were showed by Sinha *et al.*[13] and Sur D, Mukhopadhay SP[14]. The effectiveness of NESTROFT positivity among the antenatal mothers was 79% to 100% as observed by Chakrabarti et al[15] and Sirichotiyakul S et al[16] and these results were co-related with our study.

For the avoidance of unnecessary iron therapy in pregnant women with BTT, the differentiation of microcytic hypchromic anemia in BTT alone or with iron deficiency anemia or iron deficiency alone required. Hence in our study, the significant difference of the hematological parameters such as hemoglobin, the RBC counts, haematocrit, MCV, MCH, Red Cell Distribution Width, Serum ferritin and hemoglobin A2 levels were found among the pregnant women with beta-thalassaemia trait (BTT) alone or with iron deficiency Anemia (IDA) and Iron deficiency, however iron deficiency did not preclude a diagnosis of beta thalassaemia. The HB A2 levels were significantly high (mean HB A2 level 4.8 ± 0.55%) among the pregnant women with BTT alone or with IDA and HB A2 level in IDA alone was 1.2% in our study. While serum ferritin levels in these three cases were 15.2 $\pm$ 3.5ng/dl, 8.1 $\pm$ 1.1ng/dl, 7.9 $\pm$ 0.9 ng/dl respectively.

Sumera A et al[17] observed that NESTROFT was positively in 13% cases of Iron Deficiency Anemia while it remained negative in 87% cases of iron deficiency anemia and for differentiation between IDA, BTT with or without iron deficiency anemia, hematological parameters, serum ferritin and hemoglobin A2 levels were significantly different. They also observed sensitivity, specificity, positive and negative, predictive values such as 93%, 88%, 74% and 97% respectively. In our study NESTROFT was positive in 3.6% cases of iron deficiency anemia and negative in 96.4% cases of iron deficiency anemia and other laboratory parameters are accordingly with the above results for the differentiation of IDA, BTT alone and with the Iron deficiency anemia.

CONCLUSION

1. The prevalence of Beta Thalassaemia Trait among the pregnant women was 6.5% with 54.4% ratio of cousin marriages in our study. However no any husband of these pregnant women who were their cousins founded to be carriers, hence there was no risk of thalassaemia in their children.
2. in our study, the cost which was incurred in conducting the NESTROF test was only Rs. 1.50 per subject, which implied that the NESTROF test was a simple and a low cost screening tool which could be used for the identification of the carrier status of beta thalassaemia. It is useful for screening large populations, especially in the remote village areas and at the primary health care centers, where laboratory facilities are not available.
3. Along with screening of BTT in pregnancy, differentiation of BTT with or without iron deficiency anemia are essential because of the presence of microcytic hypochromic anemia in

these cases. The iron supplementation causes iron overloading in BTT cases, so therefore differentiation from iron deficiency anemia is necessary.

4. In Pakistan resulting genetic heterogencity in different ethnic groups due to the different beta genetic mutations supplemented by cousin marriages, the DNA analysis would be required for identification of BTT cases in our country to prevent birth of children with Beta thalassaemia major among the couples who were carriers of the beta thalassaemia. The DNA analysis is gold standard test used for the diagnosis of BTT cases but facilities in our countries are limited in contrast to developed countries like USA, Canada, England and Germany..

REFERENCES

1. Ghani R, Saboor M, Ahmed I, Mushtaq S. Thalassaemias. Intl. J advance biological Sci 2013;4:45-46.
2. Siew Leng Kho, Kek Heng Chua, Elizabeth G, Jin Ai MAT. The molecular confirmation of Beta Thalassaemia mutations. Journals of Sensors 2013; 13:2506-14.
3. Ramadas N, Sharhada R, Astha G. The clinical and laboratory diagnosis of Beta Thalassaemia Major; Essential of hematology Amazone publication 2013;62-70.
4. Kohne E. The treatment of Beta thalaseemia major. Dtsch. Arzlebil international 2011;108(31-32): 532-40.
5. Loukopolulos D. Haemoglobinopathies in Greece: preventation programme over the past 35 years. Ind J Med Res 2011;134(4):572–576.
6. Kulkarni P, Masthri R, Navedtha SR, Suvrana R. The prevalence of BTT in pregnancy by using the NESTROFT. J Clin Diagnosis Res 2013.7(4): 1414-17.
7. Niazi M, Tahir M, Hameed A. Laboratory parameters used in differentiating iron deficiency anemia and beta thalassaemia trait. J of Med Sci 2010;8(2):125-29.
8. World Health Organization. Facts about prevalence of thalassaemia carrier state in Pregnancy throughout world. WHO Report, 2011.
9. Abdullah KN, Azim W, Liaquat J. Risk factors including consanguinity increasing the frequency of thalassaemia in Pakistan. Pak Armed Forces Med J 2010;4:77-80.
10. Ou.Z, Li.Q, Liu,W. Sun. X. Elevated hemoglobin A2 as a marker for beta thalassaemia trait in pregnant women. Tohoku J Expl Med 2011; 223(3)223-26.
11. Shrivastav A, Patel U, Joshi JR, Kaur A, Agnihotri AS. Thalassaemia and types of beta thalassaemia. J Applied Hematol 2013l;4(3):104-109.
12. Hafeez M, Aslam M, Ali A. The effect of consanguinity on the screening of beta thalassaemia trait by Nestroft during pregnancy. J of coll of Phys and Surg Pak 2007;17(3):144-147.
13. Sinha M, Panigrahi I, Shukla J, Khanna A, Saxena R. Spectrum of anemia in pregnant Indian women and importance of antenatal screening. Indian J Pathol Microbiol 2006;49(3):373-5.
14. Sur D, Mukhopadhyay SP. Prevalence of thalassaemia trait in the state of West Bengal. J Ind Med Assoc 2006;104(1):11-5.
15. Chakrabarti I, Sinha SK, Nillanana G, Bidyut KG. Beta-thalassaemia Carrier detection by NESTROFT: An answer in rural scenario. Iranian J Pathol 2012;7(2):19-26.
16. Sirichotiyakul S, Tantipalakorn C, Sanguansermsri T, Wanapirak C, Tongsong T. Erythrocyte osmotic fragility test for screening of beta-thalassaemia trait in pregnancy. Int J Gynaecol Obstet 2004;86(3): 347-50.
17. Sumera A, Sulaiman A, SM Adnan Ali. The differentiation between Beta thalassaemia trait and iron deficiency anemia. Int J Collab Res on Internal Med and Public Health 2012;4(8):1560-66.

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Original Article

Elective Surgery

Preoperative Information & informed consent in Patients undergoing Elective Surgery at Isra University Hospital, Hyderabad

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ABSTRACT

Objective: The purpose of this study was to assess the patient's awareness of informed consent and to evaluate the current practice of obtaining informed consent from patients proposed for elective surgery in tertiary care hospital.

Study Design: Cross sectional survey

Place and Duration of Study: This study was conducted in Isra University Hospital, Hyderabad, Sindh from 2nd April 2012 to 3rd March 2013.

Materials and Methods: This study was designed as an observational investigation and no interference was made regarding the informed consent process to the patient. The selection criteria for the patients who were interviewed were convenience sampling. All adult patients of >18 years, who were undergoing various surgical procedures were interviewed after taking verbal informed consent on the second postoperative day, when they were comfortable to answer the questions. While all those patients who were uncomfortable due to pain or other reason and were unwilling to answer the questions were excluded from the study.

All the patients were asked predesigned questions related to the information they were provided before the surgery as part of standard informed consent practice.

Questions were asked in local language which includes the demographic data, operative details, risk, benefit, complications of surgery, type of anesthesia and alternative treatment options etc**.** The data was entered on SPSS version 16. Frequency & percentages were calculated to show the results.

Results: Mean age of the patients was 34.95± SD 14.256 years. 220 patients were included in the study. 183(83.18%) patients were told about the indications of surgery while 136 (61.81%) patients were not told about any complication of Surgery. Type of anesthesia was discussed in only 25(11.36%) of patients while complications of anesthesia were discussed in only 18(8.18%) of patients. 165(75%) patients were not given time to ask the questions regarding their disease or surgery. Consent by the consultants was taken in only 63(28.63%) patients.

Conclusion: The majority of the patients knew the indication of surgery but very few were informed about the possible complications and risk of the surgery and anesthesia..

Key Words: Informed Consent, Complications, Surgery, Anesthesia.

INTRODUCTION

Medical ethics is often defined as "the disciplined study of morality in medicine"[1]. It gives right to the patient to have full access to the information pertaining to his medical condition so as to be able to understand the possible course of the illness and the various implications it may have on his health. The health care providers must respect this right of the patient and offer them all possible opportunities to explain in detail about the disease and treatment options so that patients can take part in decision making and can voluntarily choose the form of health care for themselves [2,3].

Surgery and its possible complications can lead to medicolegal problems and litigation with patient alleging that they were not informed; whereas in our society, it is often presumed that telling the patient about possible complications and risks would discourage them from going ahead with the surgery[4]. A paradigm shift has been observed in the west whereby majority of patients want to be completely informed about the surgical procedure[5].

This requires that the patients be provided with all the relevant information pertaining to their case and to discuss with them all the available options including the possible complications and risks of surgery and anesthesia. It should actually be a joint decision making between the patient and the surgeon whereby a sort of agreement can be reached upon the optimum possible course to adopt in the best interests of the patient. Therefore, providing such an information and obtaining voluntary informed consent is an important and integral part of the medical practice [6] and is now universally recognized as an essential safeguard to ensure the preservation of individual rights[7].

Paternalism as well as coercion exercised during this process are unethical[1,3], contrary to the very concept of informed consent and should be avoided. It is also necessary that the patient understand the information provided[8] and that consent given is voluntary [9].

Moreover, the information provided should be in lay person language and should be clearly comprehensible.
This study was undertaken to assess the patient's awareness of informed consent and to evaluate the current practice of obtaining informed consent from patients proposed for elective surgery in tertiary care hospital.

MATERIALS AND METHODS

This cross sectional survey was conducted in IUH from 2nd April 2012 to 3rd March 2013. This study was designed as an observational investigation and no interference was made regarding the informed consent process to the patient. The selection criteria for the patients who were interviewed were convenience sampling. All adult patients of >18 years, who were undergoing various surgical procedures were interviewed after taking verbal informed consent on the second postoperative day, when they were comfortable to answer the questions. While all those patients who were uncomfortable due to pain or other reason and were unwilling to answer the questions were excluded from the study.
All the patients were asked predesigned questions related to the information they were provided before the surgery as part of standard informed consent practice.
Privacy and confidentiality was ensured throughout interview and response to individual question was only marked after reconfirming from the patient that the question has been clearly understood.
Questions were asked in local language so that they can understand easily. Questionnaire includes the demographic data, operative details, risk, benefit, complications of surgery, type of anesthesia and alternative treatment options etc. The data was entered on SPSS version 16. Frequency & percentages were calculated to show the results.

RESULTS

A total of 220 patients were included in the study. Their mean age was 34.95± SD14.236. Minimum age was 20 years and maximum was 85 year with age range of 65 years. 157(71.4%) patients were males while 63(28.6%) patients were females. Fifty seven (25.90%) patients were illiterate whereas 33(15%) were graduates. Thirty three (15%) patients belonged to upper socioeconomic class, 96(43.63%) to middle class, whereas 91(41.36%) belonged to poor socioeconomic class. (Table 1). One hundred eighty three (83.18%) patients were told about the indications of surgery while 136 (61.81%) patients were not told about any complication of surgery. Type of anesthesia was discussed in only 25(11.36%) of patients, while complications of anesthesia was discussed in only 18(8.18%) patients. 165(75%) patients were not given time to ask the questions regarding their disease or surgery (Table 2). Consent by the consultants was taken in only 63(28.63%) patients. Majority of the consents 121(55%) were given by relatives instead of patients themselves. (Table 3).

Table No.1: Demographic Data

Variables	Numbers	Percentages
Age < 30 years	97	44.1
30-40 years	64	29.1
41-51 years	28	12.7
> 51 years	31	14.1
Education . illiterate	57	25.90
Primary	60	27.27
Middle	70	31.81
Graduate	33	15
S.E.C. poor	91	41.36
Middle	96	43.63
Upper	33	15

Table No.2: Questions asked from the patients

Questions asked from patients	Numbers (percentages) yes	Numbers (percentages) NO
Have you told about nature of proposed surgical procedure	64(29.09)	156(70.9)
Other treatment options were discussed or not.	85(38.63)	135(61.36)
Have you told about complications of surgery	84(38.18)	136(61.81)
Was Choice of anesthesia discussed	25(11.36)	195(88.63)
Was Complications of anesthesia discussed	18(8.18)	202(91.81)
Have you told about hospital stay	66(30)	154(70)
Was time given to ask questions	55(25)	165(75)
Are you satisfied by the information provided to you	47(21.36)	173(78.63)
Did you read consent form	64(29.0)	156(70.9)
Is there any medicolegal significance of consent	87(39.54)	133(60.45)
Benefits of surgery were told to you	143(65)	77(35)
Did you understand the information	123(55.9)	97(44)
Did you told about the indication of surgery	183(83.18)	37(16.81)
Was written consent taken before surgery	220 (100)	00(00)

Table No.3: Consent taken and given by:

Variable	Numbers (percentages)
1. Written consent was taken by consultant	63 (28.63)
Staff nurse	66 (30)
Medical officer/ house officers	91 (41.36)
2. Consent given by Patient herself/ himself	89(40.45)
Relatives	121 (55)
Friends	10(4.54)

DISCUSSION

The results of this study showed that although 83.18% patients knew about the indication of surgery but only 29.0% patients were told about the nature of proposed surgical procedure. Similar results are seen in the study conducted by M Jawaid et al [10]. 61.81% patients in our study were not given any information about the complications of surgical procedure. The results of the study conducted by Siddiqui FG et al also revealed that 79.2% patients had not received any information about complications of surgery[11]. In another study, 69.3% patients reported receiving no information about the risk of surgical procedure [12].

Similar results are seen in the study conducted by Mc Keague et al in Auckland [13] and Kay R[14].

The anesthetists are obligated to explain to the patients, the proposed type of anesthesia and relevant risk & complications. Ideally, this information should be provided to the patient by the anesthetist directly but more often than not it is the surgeon who explains to them some of the information pertaining to the anesthetic procedure. In our study, 11.36% patients were told about the type of anesthesia and only 8.18% patients had received the information about the complications of anesthesia. Similar results are seen in the study conducted by Amin et al, whose results showed that only 15% patients received information about anesthesia complications[15]. While results of another study conducted by sidiqui FG showed that although 66% patients were informed about the type of anesthesia, but no patient was informed about complication of anesthesia[11]. Similar results are seen in the study conducted by Moores A et al. [16]

Ideally, the consent should be taken by the surgeon himself/ herself who is performing the surgery, because they are the best persons to answer the patients questions but unfortunately usually the consent is taken by medical officers, junior residents, staff nurses or even technicians who have limited knowledge and who think that just taking a signature or thumb impression over consent form is enough to dispense with the formalities[17]. In this study, consent was taken by consultants in only 28.63% of patients, while in rest of patients it was taken by the staff nurse, technicians & residents. Similar scenario is seen in the study conducted by M Jawaid, [10,] where in majority of cases, consent was taken by the duty doctors and paramedic staff.

Same is seen in Scottish study, whose results showed that patients acquired most of the information from junior doctors. [18]

In our study, 40.45% patients gave consent themselves while in rest of patients, consent was given by their family members or friends. Similar observation has been expressed in the study conducted by Jawaid M [10], where only 58.3% patients gave consent themselves & in rest of cases it was given by family members and friends. In our culture, where family values are high, the wishes of the elders may prevail and in many instances influence the decision of younger member. Moreover, usually major decisions are taken by the male head of the family. This may be the reason that usually consent is obtained/volunteered from (mostly the male) family members instead of the patients themselves, although this is challenging to the very concept of volunteerism [19.]

Informed consent has been defined as an expression of active participation of the patients in the decision making process [20,21] and it gives them the right to decide whether to receive or refuse the treatment. The health care provider is obliged to disclose all the necessary information to the patient including the type of the treatment, its benefits and possible risks and complications to help them make this decision [22]. They feel more satisfied and confident if the treating surgeon provides relevant information to them prior to surgery [17,13]. The review of national [23,15,24] & international literature[25,4,26] also highlights the importance of informed consent related to the surgery & its complications.

But in our study, one very interesting and important aspect disclosed is that while information in variable degree was provided to the patients, they were not encouraged or even afforded enough opportunity to ask questions themselves pertaining to their disease or surgery as is evident from our results which show that only 25% of the patients interacted with the interviewer and asked questions regarding their ailment. This is contrary to the very concept and spirit of joint decision making process which is often advocated in various studies.

There are some limitations of our study. As the interview was conducted in the postoperative period, so there are chances that some of the information given preoperatively might have been forgotten by the patients, preoperative interview on the other hand carries with the risk of interference with the process of care. This study was conducted in one private sector hospital. More hospitals especially public sector hospitals should be involved in the study to see the difference.

In conclusion our study has highlighted the deficiencies in many areas; hence improvements are needed to upgrade the quality of preoperative informed consent process both at patient level and health care professional level.

CONCLUSION

The majority of the patients, in our study, knew the indication of surgery but very few patients knew the different treatment options, benefit, risk and complications of surgery and anesthesia. Not all the patients were given chance to ask questions from doctor to clear up various ambiguities concerning their treatment plans.

REFERENCES

1. McCullough LB, Chervenak FA. Informed consent**.** Clin Perinatol 2007;34**:**275-85.
2. Nasilowsky W. Patient's consent to treatment with reference to the development of medical ethics. Wiad Lek 2007;60**:**198-200.
3. Del Carmen MG, Joffe S. Informed consent for medical treatment and research: a review. Oncologist 2005;10**:**636-41.
4. Burger I, Schill K, Goodman S. Disclosure of individual surgeon's performance rates during informed consent: ethical and epidemiological considerations. Ann Surg 2007; 245: 507-13.
5. Quadrelli S, Colt HG, Lyons G, Cohen D. Respect for autonomy. How much do patients want to know in order to make decisions? Medicina 2008; 68(3):198–204.
6. Molnar J. Consent in the 90s. Med Law 1997; 16:567-79.
7. Jafarey AM Informed consent in research and clinical situations. J Pak Med Assoc 2003;53: 171-2.
8. Applebaum PS, Grisso T. Assessing patient's capacities to consent to treatment. N Engl J Med 1988;99:539–43.
9. Laura WR. Informed Consent and the Capacity for Voluntarism. Am J Psychiatr 2002;159:705–12.
10. M Jawaid, M farhan, Z Masood, SMN Husnain. Preoperative informed consent: is it truly informed? Iranian J Publ Health 2012;41;9:25-30.
11. Siddiqui FG, Shaikh JM, Memon MM. An audit of informed consent in surgical patients at a university hospital. J Ayub Med Coll Abbottabad 2010;22(1). 133-135.
12. Perez-Moreno JA, Perez Carceles MD, Osuna E, Luna A. Preoperative information and informed consent in surgically treated patients. Rev Esp Anestesiol Reanim 1998;45(4):130–5.
13. McKeague M, Windsor J. Patients perception of the adequacy of informed consent: a pilot study of elective general surgical patients in Auckland. NZ Med J 2003; 116. (Online) Available from URL: http//www.nzma.org.nz/journal/116-1170/355.
14. Kay R, Siriwardena AK. The process of informed consent for urgent abdominal surgery. J Med Ethics 2001;27:157-61.
15. Amin MF, Jawaid M, Rehman S, Mudassir, Hina, Zakai SB. An audit of information provided during preoperative informed consent. Pak J Med Sci 2006;22: 10-3.
16. Moores A, Pace NA. The information requested by patients prior to giving consent to anesthesia. J Anaesthesia 2003;58(7):703-6.
17. Houghton DJ, Williams S, Bennett JD, Back G, Jones AS. Informed consent: patients' and junior doctors' perceptions of the consent procedure. Clin Otolaryngol Allied Sci 1997; 22: 515.
18. Lavelle- Jones C, Byrne DJ, Rice P, Cuschieri A. Factors affecting quality of informed consent. BMJ 1993;306:885-90.
19. Renshaw A, Clarke A, Diver AJ, Ashcroft RE, Butler PE. Informed consent for facial transplantation. Transpl Int 2006;19(11):861-7.
20. Wears S. Informed consent: patient autonomy and physician beneficence within clinical medicine. Dordrecht: Kluwer Academic Publishers; 1993.
21. Beauchamp TL, Childress JF. Principles of biomedical ethics. New York: Oxford University Press; 1994.
22. pleat JM, Dunkin CS, Tyler MP. Communication of risk in breast augmentation. Plast Reconstr Surg 2003;111:2104.
23. Bhurgri H, Qidwai W. Awareness of the process of informed consent among family practice patients in Karachi. J Pak Med Assoc 2004; 54: 398-401.
24. Haq T, Ahmad B, Akhtar W, Naseer G, Mosharraf F, Munir K. National Survey for Practice of 'Informed Consent' in the Radiology Departments J Pak Med Assoc 2003; 53: 172-6.
25. Mazur DJ. What should patients be told prior to a medical procedure? Ethical and legal perspectives on medical informed consent. Am J Med 1986; 81: 1051-4.
26. Whitney SN, McGuire AL, McCullough LB. A Typology of Shared Decision Making, Informed Consent, and Simple Consent. Ann Intern Med 2003;140:54-9.

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Original Article

Nigella Sativa Role in Liver

Role of Nigella Sativa L. Seeds against Carbon Tetrachloride Induced Liver Injury in Rabbit – An Experimental Study

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ABSTRACT

Objective: To investigate the protective effect of Nigella sativa against carbon tetrachloride (CCl_4) induced liver injury in adult male Rabbit model.

Study Design: Experimental/Analytical study

Place and Duration of Study: This study was carried out at the Animal House, Isra University from May, 2012 to October 2012.

Materials and Methods: Thirty male Rabbits were selected according to inclusion and exclusion criteria and studied. Animals were divided into three groups Carbon tetrachloride was used to induce liver injury. N. sativa seeds were administered in experimental group. Blood samples were collected from peripheral veins. Sera were used liver enzyme detection. The animals were sacrificed by over-dose of Ketamine and liver was removed for histological study. The data was analyzed on SPSS version 16.0 for Windows release (Chicago, IL, USA). A p-value of ≤ 0.5 was taken statistically significant.

Results: Liver enzymes found elevated in CCl4 compared with control group after three weeks (p=0.001) The CCl_4+ N.sativa group showed a significant reduction in liver enzymes compared with CCl_4 group (p=0.001) and control group (p=0.001). N.sativa when mixed with CCl_4 showed significant reduction in the liver enzyme. Findings shows significant hepatoprotection by the N.sativa in CCl_4 induced injury. Liver tissue sections showed least derangement of hepatocytes cords, hepatocytes damage and necrosis was minimal compared with CCl_4 group

Conclusion: Nigella sativa protects against carbon tetrachloride induced liver injury in rabbit model.

Key Words: Nigella Sativa, Carbon Tetrachloride, Liver injury.

INTRODUCTION

Liver is the largest gland of human body, which performs many biochemical and metabolic functions.[1] Free oxygen generated radicals known as reactive oxygen species (ROS) are implicated in the pathogenesis of most liver diseases, including ischemia/reperfusion injury, endotoxemia, chronic hepatitis C, alcoholic and non-alcoholic fatty liver disease, and cholestasis.[2] Carbon tetrachloride (CCl_4), a hepatotoxin, has been used extensively for decades to induce liver injury in various experimental models to elucidate the mechanisms behind hepatotoxicity.[3] It has been known for a long time that a part of the liver injury caused by this solvent may have originated through the free radical reactions to the metabolism of CCl_4 in the liver and subsequent initiation of lipid per oxidation.[3,4] In CCl_4 induced liver damage, there is an excessive lipid peroxidation leading to functional and structural disruption.[5] The damage or death of hepatocytes usually results in leakage of enzymes from affected tissue into the blood stream.[6] Serum or plasma enzyme levels have been used as markers for monitoring chemically induced liver damages. The enzymes alanine transaminase (ALT), aspartate transaminase (AST), alkaline phophatase (ALP) and lactate dehyderogenase (LDH) are important enzymes that are often employed in assessing liver injury.[1,3] Rajesh and Latha [7] showed that various herbal extracts like that of Nigella sativa could protect organs against CCl_4 induced oxidative stress by altering the levels of increased lipid peroxidation and enhancing the decreased activities of antioxidant enzymes. [7]

Nigella sativa (NS) is an aromatic plant, native to the Mediterranean region and the Southwest Asia.[8] Botanically, the NS plant belongs to the family of Ranunculaceae. In Pakistan, it is commonly known as "*Kalonji*".[9] The NS plant as well as its seeds has great importance in the old systems of therapeutics such as Unani and Ayurverdic and also in the Allopathic system of medicine. In Southeast Asia, it is publicly known as the Kalonji. In Arabic countries, it is known as the "*habat-ul-sauda*". The English people call the NS seeds as "*black cumin*". The NS plant has been a focus of most of research studies in modern era. As it has been traditionally used for centuries, hence many studies have been conducted to explore its chemical constituents and biological activities by scientific methods. Several studies on animal models have been conducted to identify the biological activities of *N. sativa* on different components of the metabolic syndrome.[10] The most active constituent of NS seeds

and oil is the Thymoquinone (TQ). Its chemical name is the "*2-isopropyl-5-methyl-benzoquinone*" and most of the therapeutic properties are attributed to this constituent. Thymoquinone yields most of the bio-therapeutic properties of NS seeds and oils. Thymoquinone is a promising dietary agent and a chemo- therapeutic and chemo-preventive agent for the treatment of diseases.[11]

However, in spite of large number of antioxidant and hepatoprotective studies carried out worldwide on *N. sativa* oil and TQ, scrutiny of published literature showed that there is a need to investigate whole seeds as they are used for treatment in folk medicine rather than the oil extract or TQ. Therefore, the present study aimed to find out if aqueous extract of whole *N. sativa* seeds possess protective effect against CCl_4-induced hepatotoxicity in experimental animals.

MATERIALS AND METHODS

An experimental study was conducted on rabbit model over a period of six months (May-October 2012). Adult Wistar male rabbits of age 7 months to 1 year, weighing 1.0-1.5 kg were included in the study. Female rabbits, age of <7 months, or >1 years, weight <1.0 Kg or > 1.5 kg and sick rabbits were excluded from the study. Animals were housed in stainless steel cages at room temperature with 55-60% humidity and exposed to 12 hour light-dark cycles. Fresh alfalfa and tap water were provided *ad-libitum*. The rabbits were divided into three groups;

Group 1. (n=10) Rabbits received 0.9% isotonic saline orally on alternate day for three successive weeks and served as control group,

Group 2. (n=10) Rabbits were given CCl_4 orally mixed in olive oil on alternate day for three successive weeks and

Group 3. (n=10) Rabbits received Nigella sativa and CCl_4 on alternate days for three successive weeks

Experimental Details: Carbon tetrachloride was purchased from scientific drug store and Nigella sativa seeds from a local herbal grocery. The N. sativa seeds were dried, cleaned and powdered to mix with isotonic saline solution. Olive oil was used as vehicle to administer CCl_4. Twenty four hours after the end of experimental period, blood samples were collected from peripheral veins. Sera were separated by centrifugation at 300xs for ten minutes. Serum samples were used to determine liver enzymes. The animals were sacrificed by over-dose of Ketamine and Xylazil as described by Nayak et al. (2006)[12] and liver was removed promptly for histological study.

Liver enzyme assay: Liver enzyme assays were determined for alanine transaminase (ALT), aspartate transaminase (AST), alkaline phophatase (ALP) and lactate dehyderogenase (LDH) using commercially available diagnostic kits.

Histological studies: Each sample of liver obtained was washed in normal saline and tissues were fixed in previously marked containers, containing 10% formaldehyde as preservative. The tissues were embedded in paraffin, cut into 5 um thick sections and stained with Hematoxylin-Eosin (H & E) and Masson`s trichrome staining for histological examination. The histological criteria included vacuolar degeneration, inflammatory cell infiltrate, congestion and necrosis. The histological parameters were graded as follows; 0 = no abnormal findings, + = mild injury, ++ = moderate injury and +++ = severe injury.[13]

Statistical analysis: The data was analyzed on SPSS version 16.0 for Windows release (Chicago, IL, USA). The continous variables were presented as mean±SD and range. The categorical variables were analyzed by Chi-square test. While the continous variables among and between groups were calculated by one-way analysis of variance (one-way ANOVA) and post hoc Tukey`s HSD testing. A p-value of ≤ 0.5 was taken statistically significant.

RESULTS

In present study, we observed major differences in liver enzyme assays among groups. The ALT, AST, ALP and LDH in sera of Rabbits treated with carbon tetrachloride were found elevated compared with control group after three weeks, with a highly significant of p-value for all variables (p=0.001) The CCl_4+ N.sativa group showed a significant reduction in the liver enzymes compared with the CCl_4 group (p=0.001) and control group (p=0.001). The N.sativa when mixed with CCl_4 showed significant reduction in the liver enzyme elevation in blood sera. The finding shows significant hepatoprotection by the N.sativa in CCl_4 induced injury. The liver enzyme assays among different groups are shown in table.1

Table No.1: Liver enzyme assays in Controls, CCl_4 and CCl_4+ N.sativa groups.

Groups	ALT (IU/L)	AST (IU/L)	ALP (IU/L)	LDH (IU/L)
Group 1 (Controls)	47.1± 2.99	89.1± 17.98	91.76± 9.01	712.4± 53.7
Group 2 (CCl_4)	197.7± 12.1	513.7 ± 19.9	176.1± 7.23	2798.8 ±145.8
Group 3 (CCl_4 + N.sativa)	84.79± 19.97	168.3± 21.3	137.9± 19.15	2140.6 ±156.4

Different parameters of histological score of liver injury are shown in Table. II. The Liver sections from control group showed intact central portal venules and compact hepatocytes arrangement. Normal looking hepatocytes with prominent nucleus, nucleolus and well preserved cytoplasm were seen in control group. The CCl_4 group showed derangement of hepatocytes cords, hydropic changes with congestion of central venules and

sinusoids, and abundant inflammatory cell infiltration. The centrilobular hepatocytes showed hydropic changes and necrosis, while midzonal and peripheral hepatocytes showed vacuolar degeneration and fatty changes in CCl_4 group. In CCl_4+N.sativa animals, liver tissue sections revealed least derangement of hepatocytes cords, hepatocytes damage and necrosis was limited compared with CCl_4 group.

Table No.2: Histological score of liver injury

Groups	Vacuolar degeneration	Inflammatory cell infiltrate	Congestion	Necrosis
Group 1 (Controls)	0	0	0	0
Group 2 (CCl_4)	+++	+++	+++	+++
Group 3 (CCl_4 + N.sativa)	+	+	++	+

DISCUSSION

Carbon tetrachloride is a commonly used hepatotoxin in experimental study of liver diseases in animal models.[14] The liver toxicity is produced by release of free radicals and lipid peroxidation[15] which causes hepatocyte necrosis, inflammation and fibrogensis.[16] The serum levels of ALT, AST, ALP and LDH reflect the physiological state of liver. The ALT, AST, ALP and LDH are released parallel to the distortion of liver, and cellular injury of the organ caused by toxic metabolites and diseases.[17] The present study indicates that the carbon tetrachloride caused an increase in serum levels of liver enzymes in rabbits as compared to control group; that is carbon tetrachloride induced a detectable damage to liver sufficient to release liver enzymes, as previously reported by Hukkeri et al.[18] The Hukkeri proved elevation in the plasma level of cytoplasmic and mitochondrial enzymes due to liver injury induced by CCl_4 in animal models.[18] Increased blood levels of liver enzymes indicate rupture of the cell membrane and damage of hepatocytes sufficient to release cytoplasmic enzymes into blood circulation.[19] In the present study, damage of liver caused by CCl_4 was evident by the rise in serum marker enzymes beside the histological changes in liver tissue. Administration of CCl_4 significantly increased the serum levels of liver enzymes; AST, ALT, ALP and LDH, which are indices of liver cell damage and leakage of enzymes from cells.[7,20] It is reported that rise in ALT is almost always due to hepatocellular damage; accompanied by rise in AST and ALP.[21] The carbon tetrachloride is found to produce free radicals, which affect cellular permeability of hepatocytes leading to elevated levels of liver enzymes.[22]

The histological examination of current work correlates with disturbance in biochemical markers of hepatocellualr damage. Histological examination of carbon tetrachloride group revealed disruption of normal structural organization of hepatic architecture, hepatic lobules and loss of the characteristic cord-like arrangement of the normal liver cells. The hepatic cells revealed characteristic appearance of cellular injury and showed marked cytoplasmic vacuolization. The nuclei of these cells were pyknotic. Lymphocytic infiltration and fatty change was also evident. Our findings are supported by previous studies which showed that carbon tetrachloride induces centrilobular hepatocellular vacuolar degeneration and necrosis.[23,24,25] The carbon tetrachloride induced hepatotoxicity has been attributed to the formation of free radicals during its detoxification in hepatocytes smooth endoplasmic reticulum by the cytochrome P450.[26] Balahoroglu et al.[27] reported that carbon tetrachloride induces lipid peroxidation which produces changes in biological membranes resulting in serious hepatocellular injury. Treatment with *N. sativa* seeds significantly reduced effects of carbon tetrachloride induced hepatocellular damage and it was evidenced by the decreased level of liver enzymes and restoration of hepatocellular architecture. Similarly, Al-Razzuqi et al.[28] had reported protective effect of oil extract of *N. sativa* seeds against carbon tetrachloride induced acute liver injury in experimental rabbit models. Also, protective effect of black seed oil against lead acetate-induced hepatic tissue damage in mice was investigated.[29] The findings are consistent with our current work. The present study reveals that the N.sativa seeds possess hepatoprotective potential against oxidative damages caused by carbon tetrachloride. The N.sativa may be used as an effective protector against chemical induced liver damages.

CONCLUSION

The present study concludes that *Nigella sativa* seeds possess hepatoprotective potential against oxidative damages caused by carbon tetrachloride. The *N.sativa* may be used as an effective protector against chemical induced liver damages. Histological findings also indicate liver protection by Nigella sativa against CCl_4 induced liver damages in present study.

REFERENCES

1. Essawy AE, Abdel-Moneim AM, Khayyat LI, Elzergy AA. Nigella sativa seeds protect against hepatotoxicity and dyslipidemia induced by carbon tetrachloride in mice. J Appl Pharm Sci 2012;2 (10): 021-5.
2. Wafay H, El-Saeed G, El-Toukhy S, Youness E, Ellaithy N, Agaibi M, et al. Potential effect of garlic oil and silymarin on carbon tetrachloride induced liver injury. Austr J Basic Appl Sci 2012; 6 (3):409-14.
3. Obi FO, Omogbal LA, Orlafo OS, Ovat OD. Effect of a Short Time Post Carbon Tetrachloride

Treatment Interval on Rat Plasma Enzyme Levels and Percentage Mortality. J Applied Sci Environ Mgt 2001; 5: 5-8.
4. Muriel P, Albo N, Perez-Alvarez VM. Kupffer cells inhibition prevents hepatic lipid peroxidation and damage induced by carbon tetrachloride. Comp Biochem Physiol C Toxicol Pharmacol 2001; 130: 219-26.
5. Rasha SA, Ashraf AA, Aly R. Carbon tetrachloride-induced liver disease in rats: the potential effect of supplement oils with vitamins E and C on the nutritional status. German Med Sci 2009; 7: 1612-3174.
6. Rost DA, Welker DA, Welker J, Millonig G, Berger I, Autschbach F, et al. Liver-homing of purified glucose oxidase: A novel in vivo model of physiological hepatic oxidative stress (H_2O_2). J Hepatol 2007; 46: 482-91.
7. Rajesh M, Latha M. Preliminary evaluation of anti-hepatotoxic activity of Kamilari, a polyherbal formulation. J Ethnopharmacol 2004; 91: 99-104.
8. Khan MLA. Kalonji (Nigella sativa). Islamic Voice 2009; 1308 (152): 1-2.
9. Ahmad Z, Ghafoor A, Aslam M. Nigella Sativa: A potential commodity in crop diversification traditionally used in healthcare. MINFAL 2004; 5:34.
10. Najmi A, Haque SF, Naseeruddin MF, Khan RA. Effect of Nigella Sativa oil on various clinical and biochemical parameters of metabolic syndrome. International J Diabet Metab 2008; 16:85-87.
11. El-Din K, El-Tahir H. The Black Seed Nigella sativa Linnaeus - A Mine for Multi Cures: A Plea for Urgent Clinical Evaluation of its Volatile Oil. JTUM 2009; S 1 (1): 1-19.
12. Nayak S, Nalabothu P, Sandiford S, Bhogadi V, Adogwa A. Evaluation of wound healing activity of Allamanda cathartica L. and Laurus nobilis. L. Extracts on rats. BMC Complementary and Alternative Medicine 2006; 6: 12.
13. Murat-Bilgin H, Atmaca M, Deniz-Obay B, Ozekinci S, Taşdemir E and Ketani A. Protective effects of coumarin and coumarin derivatives against carbon tetrachloride-induced acute hepatotoxicity in rats. Exp Toxicol Pathol 2011; 63(4): 325-30.
14. Shenoy KA, Somayaji SN and Bairy KL. Hepatoprotective effects of Ginkgo Biloba against carbon tetrachloride induced hepatic injury in rats. Ind J Pharmacol 2001; 33: 260-66.
15. Basu S. Carbon tetrachloride-induced lipid peroxidation: eicosanoid formation and their regulation by antioxidant nutrients. Toxicol 2003; 189: 113-27.
16. Fu YS, Zheng S, Lin J, Ryerse J and Chene A. Curcumin protects the rat liver from CCl4-caused injury and fibrogenesis by attenuating oxidative stress and suppressing inflammation. Mol Pharmacol 2008; 73(2): 399-409.
17. Patrick-Iwuanyanwu KC, Wegwu MO, Ayalogu EO. Prevention of CCl4-induced liver damage by ginger, garlic and vitamin E. Pak J Biol Sci 2007; 10(4): 617-21.
18. Hurkkeri VI, Jaiparkash B, Lavhale RV, Karadi RV, Kuppast IJ. Hepatoprotective activity of Anthus Excelsa Roxb leaf extract on experimental liver damage in rats. J Pharmacogn 2002;11: 120-28.
19. Shaarawy SM, Tohamy AA, Elgendy SM Elmageed ZY, Bahnasy A, Mohamed MS, et al. Protective effects of garlic and silymarin on NDEA-induced rats hepatotoxicity. Int J Biol Sci 2009; 5(6): 549-57.
20. Bashandy S, Al-Wasel S. Carbon tetrachloride-induced hepatotoxicity and nephrotoxicity in rats: Protective role of vitamin C. J Pharm Toxico 2001; 16(30): 283-92.
21. Ravikumar V, Shivashangari K, Devak IT. Hepatoprotective activity of Tridax procumbens against d-galactosamine / lipopolysaccharide-induced hepatitis in rats. J. Ethnopharmacol 2005; 101: 55-60.
22. Kumar P, Sivaray A, Elumalai E, Kumar B. Carbon tetrachloride–induced hepatotoxicity in rats - protective role of aqueous leaf extracts of Coccinia grandis. Int J Pharm Tech Res 2009; 1(4): 1612-15.
23. Trivedi P, Mowat A. Carbon tetrachloride-induced hepatic fibrosis and cirrhosis in the developing rat: an experimental model of cirrhosis in childhood. Br J Exp Pathol 1983; 64(1): 25–33.
24. Berman E, House D, Allis J, Simmons J. Hepatotoxic interactions of ethanol with allyl alcohol or carbon tetrachloride in rats. J Toxicol Environ Health 1992; 37(1): 161–76.
25. Brandao C, Ferreira H, Piovesana H, Polimeno N, Ferraz J, de-Nucci G. Developmental model of liver cirrhosis in rabbits. Clin Exp Pharma Physiol 2000; 27: (12): 987-90.
26. Wang P, Kaneko T, Tsukada H, Nakano M, Nakajima T, Sato A. Time courses of hepatic injuries by chloroform and by carbon tetrachloride comparison of biochemical and histopathological changes. Arch Toxicol 1997; 71: 638-45.
27. Balahoroglu R, Dulger H, Ozbek H, Bayram I, Sekeroglu M. Protective effects of antioxidants on the experimental liver and kidney toxicity in mice. Eur J Gen Med 2008; 5 (3): 157-64.
28. Al-Razzuqi R. Hussaini J, Al-Jeboori A. Protective effect of Nigella sativa against carbon tetrachloride induced acute liver injury in experimental rabbit models. Int J Green Pharm 2011; 5(3): 198-200.
29. Alarifi S, Aldahmash B, El-Nagar D, Dkhil M. Effect of corn oil, flaxseed oil and black seed oil on lead acetate-induced hepatic tissue damage: A histological study. J Med Plants Res 2012; 6(24): 4128-34.

Original Article

Meningitis in Newborns

Frequency of Meningitis in Newborns Presenting with Sepsis to Nishtar Hospital, Multan

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ABSTRACT

Objective: To determine the frequency of meningitis in newborns presenting with neonatal sepsis to Nishtar Hospital, Multan.

Study Design: Descriptive study

Place and Duration of Study: This was carried out in the Department of Paediatric Medicine, Nishtar Hospital, Multan from January 2012 to December 2012.

Materials and Methods: A total of 73 newborns were included in the study conducted at Nishtar Hospital, Multan.

Results: Out of 73 newborns with sepsis, 20 (27.4%) were diagnosed to have meningitis. Majority of the neonates with sepsis (52.1%) were between 1-7 days of their life, however, mean age of all cases was 10.49 $\pm$ 7.79 days (range 2-25 days). There were 39 (53%) male, 34 (47%) female babies. 36 (39.3%) neonates having low birth weight (1.5-2.5 kg) however mean weight was 2.55 $\pm$ 0.39 kg (range 1.8-3.6 kg).

Conclusion: Higher rate of meningitis (27.4%) diagnosed in present study shows better diagnostic facilities and on the other hand alarm us to take prompt measures to prevent it.

Key Words: Neonatal sepsis, Meningitis, lumbar puncture

INTRODUCTION

Infections are a frequent and important cause of neonatal and infant morbidity and mortality. As many as 2% of fetuses are infected in utero and upto 10% of infants have infections in the 1st month of life[1]. Newborns infants are less capable of responding to infection because of or more immunologic deficiencies. Co-existing conditions often complicate the diagnosis and management of neonatal infections[2].

Sepsis is the commonest cause of neonatal mortality. It is responsible for about 30-50% of the total neonatal deaths in developing countries. It is estimated that upto 20% of neonates develop sepsis and approximately 1% die of sepsis related causes[3].

Neonatal sepsis, also termed as sepsis neonatorum, refers to a group of physical and laboratory findings that occur in response to invasive infection within the first 30 days of life[4]. Neonatal infections currently cause 1.6 million deaths in developing countries. Resistance to commonly used drug is emerging as the most important problem globally. Therefore normal use of antibiotic is a priority to reduce the burden of treatment failure[5].

World Health Organization estimates that globally there are about 5 million neonatal deaths a year[6]. Ninety eight per cent of them are occurring in developing countries between 11-88/1000 live birth in Asia, Africa and Latin America. It is generally assumed that neonatal mortality in developing countries is under reported by at least 20%[7]. The most common causes of death in neonatal period are infections (32%) including septicemia, meningitis, pneumonia, diarrhea and neonatal tetanus followed by birth asphyxia (29%) and prematurity (24%)[8]. Neonatal meningitis has poor prognosis with case fatality rate of 15-25% and morbidity rates of 25% or more.

MATERIALS AND METHODS

This descriptive study was carried out in the Department of Paediatric Medicine, Nishtar Hospital, Multan from January 2012 to December 2012. A total of 73 newborns were included in the study.

RESULTS

In present study, 73 neonates with sepsis were included, of which 20 (27.4%) neonates were diagnosed to have meningitis. There were 39 (53%) male and 34 (47%) female babies. Out of 20 neonates who developed meningitis, 11 (55%) were male and 9 (45%) were female. There were 11 (55%) delivered vaginally and 9 (45%) neonates were delivered by caesarean section. Other results are shown in following tables.

Table No.1: Age distribution (n=73)

Ade (days)	No. of children	%age
1-7	38	52.1
8-14	08	11.0
15-21	17	23.23
22-28	10	13.7

Table No.2: Weight distribution (n=73)

Weight (kg)	No. of children	%age
1.5-2.5	36	49.3
2.6-3.5	35	47-9
> 3.5	02	02.8

Table No.3: Age distribution in relation to meningitis (n=20)

Ade (days)	No. of children	%age
1-7	0	0
8-14	02	10.0
15-21	10	50.0
22-28	08	40.0

Table No.4: Persons conducting delivery in relation to meningitis (n=20).

Person	No. of newborns with meningitis	%age
Dai	04	20.0
LHV	01	05.0
Doctor	15	75.0

Table No.5: Weight distribution in relation to meningitis (n=20)

Weight (kg)	No. of children	%age
1.5-2.5	06	30
2.6-3.5	12	60.0
> 3.502	10.0	50.0

DISCUSSION

Neonatal sepsis is one of the commonest causes of neonatal mortality in the developing world[9]. The incidence of meningitis is usually a fraction of the number of infants with sepsis, varying in different settings from 1/4th to 1/3rd. the mortality rate is high, varying in some series from 15-50%[10].

Present study was conducted to determine the frequency of meningitis in newborns presenting with neonatal sepsis to Nishtar Hospital, Multan. Majority of neonates 38 (52% were in their first week of life. Male were 39 (53%) while females were 34 (47%). Almost half (49.3%) of the neonates had birth weight < 2.5 kg. our study results coincide with local and international literature. Waheed et al in a study reported the male to female ratio 2.1:1. Low birth weight babies were (62.6%). There were 62.3% cases of early onset (< 7 days) sepsis and 37.7% cases of late onset (> 7 days)[11]. It was reported in a study that out of 109 episodes of blood culture proven sepsis 68 presented as early onset and 41 as late onset sepsis in their study[12].

In present study, frequency of meningitis was 27.4%, slightly higher than that of results from international studies. However, different studies have reported variable rates of meningitis. Our study results coincide most of the study results in international literature. Rasul et al have reported 6-3% incidence of meningitis in the study[5]. The incidence of meningitis was reported to be 3/1000 liver births[13]. In an Indian study it is reported that among babies with suspected clinical sepsis, 3.3% were diagnosed to have meningitis[14]. Fida et al have reported that among 35 full term neonates with suspected sepsis, meningitis was diagnosed to have 20%[15]. Davies and Rudd have reported that the incidence of bacterial meningitis is approximately 0.3/1000 live births in industrialized countries[16].

The incidence of neonatal meningitis is difficult to accurately determine because of testing limitations. However, a recent study reported estimated incidence of neonatal meningitis from 0.48/1000 to 2.4/1000 live births[17]. The reported incidence of neonatal sepsis varies from 7.1-38/1000 live births in Asia[18]. Another recent publication that looked at neonatal infections in Africa and South Asia found an incidence of neonatal meningitis ranging from 0.8-6.1/1000 live births[19]. Jiang et al have reported that meningitis developed in 11.8% of patients in early onset and 5.2% in late onset group[20]. Caserta has concluded that meningitis occurs in about 15% of neonates with sepsis and occasionally occurs in isolation[21].

It is revealed that near 25% of the risks are associated with development of meningitis in sepsis patients[22]. Phiri et al reported that of the 784 suspected cases of sepsis, 202 were diagnosed to have meningitis[23]. Ray et al revealed that the statistically estimated maximum risk of meningitis in suspected early sepsis in only 1.1% and that in blood culture proved sepsis is 0-16.3%[24]. Visser and Hall suggested that neonatal septicaemia can coexist with meningitis in up to 30% of patients[25]. Wiswell eta al have reported that the incidence of meningitis in the first 72 hours of life was 0.25/1000 live births[26]

CONCLUSION

Higher rate of meningitis (27.4%) diagnosed in present study shows better diagnostic facilities and on the other hand alarm us to take prompt measures to prevent it.

REFERENCES

1. Stoll BJ. Infections of the neonatal infant. In: Nelson WE, Behraman RE, Kleigman RM, Jenson HB, editors. Nelson's textbook of pediatrics. Philadelphia: WB Saunders; 2000,p.623-4.
2. Bang AT, Bang RA, Bacule SB, Reddy HM. Effect of home based neonatal care. Lancet 1999; 354: 1955-61.
3. Stoll BJ. The global impact of neonatal infection. Clin Perinatol 1997; 24: 1-21.
4. David Hackam. Neonatal sepsis: when little babies get very sick. [on line]. 2008 [cited 2010 May 12].
5. Rasul CH, Hassan MA, Habibullah M. Neonatal sepsis and use of antibiotic. Pak J Med Sci 2007; 23: 78-81.
6. Lawn JE, Consens S, Zupan J. 4 million neonatal deaths. Lancet 2005; 365: 891-900.

7. WHO. Perinatal mortality. Geneva. WHO. 1996. Report No.WHO/REH/HSM/967.
8. Banf AJ, Bang RA, Baitale B. Burden of morbidities and unmet need for health care. Ind Pediatr 2001; 38: 962-5.
9. Wu JH, Chen CY, Tsao PN, Hsieh WS, Chou HC. Neonatal sepsis. Peiatr Neonatal 2009; 50: 88-95.
10. Holt DE, Halket S, DeLouvois J. Neonatal meningitis in England and Wales. Arch Dis Child Fetal Neonatal Ed 2001; 84: 85-9.
11. Waheed M, Laeeq A, Maqbool S. The etiology of neonatal sepsis. J Coll Phys Surg Pak 2003; 13: 449-52.
12. Anweer S, Mustafa S, Pariyani S, Ashraf S, Taufiq K. Neonatal sepsis. J Pak Med Assoc 2000;50: 91-4.
13. Sankar MJ, Agarwal R, Deorari AK, Paul VK. Sepis in the newborn. Ind J Pediatr 2008;75: 261-6.
14. Kumar P, Sarkar S, Narang A. Role of routine lumbar puncture in neonatal sepsis. J Paeditr Child Heal 2008; 31: 8-10.
15. Fida NM, AlMughales JA, Serum concentrations of interleukin-1 alpha. Saudi Med J 2006; 27: 1508-14.
16. Davies PA, Rudd PT. Incidence, the developing brain. Neonatal meningitis. Cambridge: Cambridge University Press; 1994.
17. Tiskumara R, Fakharee SH, Lin CQ, et al. Neonatal infection in Asia. Arch Dis Child Fetal Neonatal ED 2009;94: 144-8.
18. Reeta R. Epidemiology of neonatal infections. J Neonatol 2009; 23: 45-7.
19. Thaver D, Zaidi AK. Burden of neonatal infections in developing countries. Pediatr Infect Dis J 2009; 29: 3-9.
20. Jiang J, Chiu N, Huang F, Kao H, Hsu C, Hung H et al. Neonatal sepsis in the neonatal intensive care unit. J Microbiol Immunol Infect 2004; 37: 301-6.
21. Caserta MT. Neonatal meningitis. [on line]. 2009 [cited 2010 May 15].
22. deSilva LAP, Cavalheiro LG, Queiros F. Prevalence of newborn bacterial meningitis and sepsis. Braz J Infect Dis 2007; 11: 102.
23. Phiri A, Milledge J, Calls JS, Graham SM. Aetiology of neonatal sepsis. Malawi Med J 2005; 17: 92-6.
24. Ray B, Mangalore J, Harikumar C, Tualdhar A. Is lumbar puncture necessary for evaluation of early neonatal sepsis? Arch Dis Child 2006; 91: 1033-5.
25. Visser VE, Hall RT. Lumbar puncture in the evaluation of suspected neonatal sepsis. J Oediatr 1980; 96: 1063-7.
26. Wiswell TE, Baumgart S, Gannon CM, Spitzer AR. No lumbar puncture in the evaluation for early neonatal sepsis. Pediatrics 1995; 95(6): 803-6.

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Original Article

Treatment of Mandibular Fracture

Comparison Between Extraoral and Intraoral Surgical Procedures for the Treatment of Mandibular Angle Fractures Using Semirigid Fixation or Rigid Fixation

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ABSTRACT

Objective: The purpose of this study was to determine various post operative complications associated with two surgical procedures used for reduction of mandibular angle fractures.

Study Design: Experimental study.

Place & Duration of Study: The study was conducted in Department of Oral & Maxillofacial Surgery Liaquat University Hospital Hyderabad from February 2012 to February 2013.

Materials and Methods: Thirty patients with mandibular fractures were divided in to two categories. Fifteen patients were treated by intra oral approach (Group A) and Fifteen by extra oral approach (Group B). At different intervals of their post operative visits, these patients were evaluated for post operative complications of infection, nerve damage, keloid scar, facial cosmetic dissatisfaction, malocclusion and limitation in mouth opening.

Results: 23 male patients and 07 female patients were affected with mandibular fracture. Most common etiology was RTA in 66.6% case. Most common complication with intraoral approach was postoperative infection while facial dissatisfaction was most commonly noticed with extraoral approach.

Conclusion: The intra oral approach with rigid fixation is our effective and superior technique as compare to the extra oral approach.

Key Words: Mandibular angle fracture, Intra/Extra Oral approach, Semirigid fixation or rigid fixation Postoperative complications

INTRODUCTION

Mandibular fractures are one of the most common facial fractures. It is a frequent occurrence in Pakistan and is associated with high incidence of facial fractures in different combinations.[1]

Management of mandibular angle fractures is often challenging and results in the highest complication rate among fractures of the mandible. Optimal treatment of angle fractures remains controversial. The large number of studies on mandibular angle fracture treatment attests to the fact that no single approach has been shown to be ideal and that treatment of mandibular angle fractures remains conceptually controversial, with a bothersome complication rate. During the past decade, significant attention has been placed on fixation of angle fracture using a variety and combination of small plates secured with monocortical screws[2-4].

Different modalities available for the treatment of mandibular fractures are:

Maxillo mandibular fixation (MMF) alone eg.dental wiring, arch bar etc.

Maxillo mandibular fixation with osteosynthesis: eg. Transosseous wiring, circumferential wiring, external pin fixation.

Osteosynthesis without maxillo mandibular fixation e.g., Mini plating, Non compression and compression plates, Lag screws.[5]

Mandibular angle fractures are prone to the highest complication rate of all fracture sites, ranging from 0% to 32%.The ideal treatment for these fractures remains controversial, and the reported complication rates, though many involve noncompliant populations, remain unacceptably high.

The goal of our study was to evaluate and describe our clinical experience and complication rate associated with two surgical procedures used for stabilization of displaced mandibular angle fractures.[6]

MATERIALS AND METHODS

This clinical study which followed a Quasi Experimental design was carried out on 30 patients presenting with mandibular angle fracture at the department of Oral and maxillofacial Surgery, Liaquat University Hospital Hyderabad. Both male and female patients aged 20-40 years were included in the study which was carried out from 8th February, 2011 to 8th February, 2012. The patients were divided into two groups A and B by using random number table. After randomization, any patient who was not found to be

suitable for the assigned treatment group was excluded from the study. Two standarized surgical techniques were used to treat these patients. 15 patients of group A were treated with intra oral approach and 15 patients of group B were treated with extra oral approach. Patients were selected by following inclusion and exclusion criteria.

Inclusion Criteria: Patient aged 20 to 40 years, medically fit to undergo surgery, sufficient bilateral dentition to allow Maxillo-Mandibular Fixation, Patient consent to participate in the study.

Exclusion criteria: Pathological fractures, Condylar and sub-condylar fractures, edentulous patients, fractures of the middle third of face.

A standard history and clinical examination chart was completed for each patient included in the study to reach a conclusive diagnosis. A preformed proforma was used to obtain the following information:

Age and gender of the patient. The etiology of the injury, recorded as road traffic accident, falls, assaults, and sports injuries.

Orthopantomogram was the standard radiograph which was supplemented by posterior anterior view of face. Patient with history of trauma, swelling, pain and step deformity on palpation at the angle of mandible along with disturbed occlusion, showing bony discontinuity on radiograph were diagnosed as fracture. The experimental outcome of the surgical procedure was explained to every patient included in this study and informed consent was taken before surgery.1-week duration of postsurgical oral antibiotic therapy and every patient was followed for 4 weeks. Postoperative radiograph was taken in follow-up for each patient, whenever required. During follow-up period any postoperative complication found, was recorded on the preformed Performa under the following heading for the two treatment modalities of the mandibular angle fracture:

Immediate postoperative complication (nerve damage)

Late post operative complication (i.e. infection, limited mouth opening, malocclusion, keloid scar and facial cosmetic dissatisfaction).

These have been explained with the help of tables. The collected data was entered and analyzed using SPSS version 16.0.

RESULTS

The detailed distribution of gender of the patients is shown in Table 1.

The results related to the etiology of the fracture have been categorized as a road traffic accidents, falls, assaults, sports injuries and iatrogenic.

The key findings of table 3 are that the post operative marginal mandibular nerve damage was not present in any of the patients treated with intraoral approach (Group A), as compared to this post operative marginal mandibular nerve damage was present in 20% of the patients treated with extraoral approach (Group B). Post operative facial cosmetic dissatisfaction was present in only 6.6% of the patients (Group A) as compared to 60% patients (Group B).

Table No1: Gender distribution of patients

Gender	Number &Frequency
Male	23(76.6%)
Female	7(23.3%)
Total	30(100%)

Table 2 shows the distribution of sample according to the etiology of fracture.

Table No.2: Etiology of fracture

Etiology of fracture	No of patients
Road traffic accidents	20 (66.66%)
Assaults	4(13.33%)
Falls	4(13.33%)
Sports	1 (3.3%)
Iatrogenic	1 (3.3%)

Details about postoperative complications related to both types of treatment modalities are given in Table 3.

Table No.3: Complications rates in the entire treatment:

Postoperative Complications	Intra oral approach		Extra oral approach	
	Present	Absent	Present	Absent
Post operative Infection	2 (13.3)	13 (86.6%)	3 (20%)	12(80%)
Marginal Mandibular nerve damage	0 (0%)	15 (100%)	3 (20%)	12 (80%)
Malocclusion	1 (6.6%)	14 (93.3%)	2 (13.3%)	13 (86.6%)
Mouth opening Compromise	1 (6.6%)	14 (93.3%)	2 (13.3%)	13 (86.6%)
Facial Cosmetic dissatisfaction	1 (6.6%)	14 (93.3%)	9 (60%)	6 (40%)
Keloid scar	0 (0%)	15 (100%)	1 (6.6%)	14 (93.3%)

DISCUSSION

The aim of this study was to compare the two surgical procedures i.e. intraoral approach and extraoral approach, used for reduction of mandibular angle fractures in terms of various post operative complications i.e. infection, nerve damage, malocclusion, Facial Cosmetic dissatisfaction, keloid scar and limited mouth opening to determine which of the two procedures show better post operative results.[6-8] In this study, Road traffic accident with motor-cycle riding was the common cause of mandibular fractures

which is different than the study of Zaki MA[9] and Muzzafar K[10] who have reported falls as the second most commonest factor of mandibular fractures[13-15]. The results confirm that post operative complication rates in terms of nerve damage (20%) and Facial Cosmetic dissatisfaction (60%) were much higher in patients where extra oral approach was used. This finding is similar to other studies which have reported the advantages of the intraoral route over the extraoral route. The results of the study show that infection occurred in13.3% of the patients treated through intra oral approach whereas it was 20% with extra-oral approach. These results are comparable with the study conducted by Lawoyin DO[11], in which the infection rate in patients treated with open reduction and internal fixation for mandibular fractures was 12.5%.Malocclusion was assessed in this study solely through patient complaints as in other studies. It was observed in 6.6% of the cases operated by intra-oral approach and 13.3% in the cases operated by extra-oral approach. Nerve damage in terms of both sensory and motor neuropathies was noted according to the patient's complaint. Motor disturbances were seen in the patient's treated by extra oral approach, which is similar to study by Renton TF[12]. Hypertrophic(keloid) scars were seen in 6.6% of the patients in extraoral approach which is comparable with study which reported 2.56 % hypertrophic scar through extra oral approach.

The possible limitation of the study is duration. However since this study followed an experimental study design, the sample size was sufficient enough to fulfill the aims and objectives of the study. Based on the findings of this study it is recommended that the motor-cycle persons must used helmet while driving.

CONCLUSION

Based on this single study, at a single institution, we can conclude that the intra oral approach with rigid fixation is our effective and superior technique as compare to the extra oral approach but distal to last molar difficulty in placement of mini-plate via a intraoral approach.

REFERENCES

1. Ajmal S, Khan MA, Jadoon H, et al. Management protocol of Mandibular fractures at Pakistan Institute Of Medical Science, Islamabad, Pakistan. J Ayub Med Coll Abottabad 2007;19(3):51-5.
2. Fridrich KL, Pena-Velasco G, Olson RA. Changing trends with mandibular fractures. J Oral Maxillofac Surg 1992;50:586-589.
3. Haug RH, Barber E, Reifeis R. A comparison of mandibular angle fracture plating techniques Oral Surg Oral Med Oral Pathol 1996;82:257-263.
4. Singh V, Gupta M, Bhagol A. Is a Single Miniplate at the inferior Border Adequate in the Management of an Angle Fracture of the Mandible. American Academy of Otalaryngology – Head and Neck Surgery Foundation 2011;145:213.
5. Ali S, Ahmed R, Dastagir MU, Comparison of two surgical procedures in reduction of mandibular angle fractures. Pakistan Oral & Dental J 2010;30:2.
6. Mehra P, Murad H, Internal fixation of mandibular angle fractures. A comparison TWO techniques. J Oral Maxillofacial Surg 2008;66(11):2254-60.
7. Chritah A, Lazow S, Berger J. Transoral 2.0-mm miniplate fixation of mandibular fractures plus 1 week maxillomandibular fixation: A prospective study, J Oral Maxillofacial Surg 2005; 63:1737.
8. Andrew J, Gear L, Apasova E, John P. Schmitz et al. Treatment modalities for mandibular angle fractures. J Oral Maxillfac Surg 2005; 63: 655-663.
9. Zaki MA, Islam T, Memon S, Aleem A. Pattern of maxillofacial injuries received at Abbasi Shaheed Hospital, KMDC, Karachi. Annual Abbasi Shaheed Hosp 2002;7:291-93.
10. Muzzafar K. Management of maxillofacial Trauma. AFID Dent J 1998; 10: 18-21.
11. Lawoyin DO, Lawoyin JO, Lawoyin TO. Fractures of facial skeleton in Tabuk North West Armed Forces Hospital. A five-year review. African J Med & Med Sci 1996; 25: 385-87.
12. Renton TF, Wiesnfeld D. Mandibular fractures osteosynthesis: a comparison of three techniques. Br J Oral Maxillofac Surg 1996; 34: 166-73.
13. J.E barrera, MD; Arlen, D Meyer, MD. Mandibular Angle Fractures. Medscape 2010.
14. Alkan A, Celebi N, Ozden B, Bas B, Inal S. Biomechanical comparision of different plating techniques in repair of mandibular angle fractures. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2007;104:752-6.
15. Maloney PL, Lincoln RE, Coyne CP. A protocol for the management of compound mandibular fractures based on the time from injury to treatment. J Oral Maxillofac Surg 2001;59: 879–884.

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Original Article

Causes of UTI in Children

Clinical Presentation and Aetiological Agents of Urinary Tract Infection in Children

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ABSTRACT

Objective: To describe the clinical presentation and to identify the aetiological agents causing urinary tract infection.

Study Design: Descriptive study

Place and Duration of Study: This study was carried out in the Department of Paediatric Medicine, Nishtar Medical College/Hospital, Multan from January 2013 to December 2013.

Materials and Methods: A total of 50 children were included in the study conducted at Nishtar Medical College/Hospital, Multan.

Results: Out of 50 children, 38 were female and 12 were male. 28 children were from 1-3 years age group and 22 were of more than 3 years. Most common clinical presentations were fever, urinary symptoms, vomiting and pain abdomen. Aetiological agents in study were Escherichia coli, klebsiella, proteus, staphylococcus saprophyticus, streptococcus fecalis or pseudomonas.four cases of UTI (3 females, 1 male) were associated with nephritic syndrome. Four cases were associated with malnutrition.

Conclusion: It is concluded from study that UTI is more common in females between the age of 2-4 years mostly due to problems in their toilet training.

Key Words: Urinary tract infection, Fever, Dysuria

INTRODUCTION

Urinary tract infection (UTI) is defined as the presence of a single bacterial growth of >10 colony forming units/ml[1] in a clean catch, mid stream urine sample or > 10 organisms/ml in a catheter or suprapubic aspirated of urine[2].

Urinary tract infections are a common clinical problem in childhood and may lead to renal scarring, hypertension or end stage renal dysfunction[3]. Urinary tract infections occur in 3-5% of girls or 1% of boys. In girls, the first UTI usually occurs by the age of 5 years, with peaks during infancy or toilet training. In boys, most UTIs occur during the first year of life; UTIs are much more common in uncircumcised boys[4]. Several studies shown that infants and young children can present with fever as a sole manifestation of a UTI[5].

Symptoms of UTI in older children may include fever, urinary symptoms and abdominal pain[6]. Occasionally, older children may present with failure to thrive, nephropathy or hypertension secondary to unrecognized UTIs earlier in childhood[7].

MATERIALS AND METHODS

This descriptive study was carried out in the Department of Paediatric Medicine, Nishtar Medical College/Hospital, Multan from January 2013 to December 2013. A total of 50 children were included in the study.

RESULTS

Out of 50 children, 38 were female and 12 were male. 28 children were from 1-3 years age group and 22 were of more than 3 years. Mean age of the children was 2.75 $\pm$ 1.05. Mean weight was12.41 $\pm$ 2.3 kg and mean height was 91.1 $\pm$ 7.97 cm.

The most common symptoms noted in present study were fever 84%, urinary frequency 32% and vomiting 30% as shown in table-1.

Clinical findings noted were generalized abdominal tenderness 24%, lumber tenderness 18% and suprapubic tenderness 14% as shown in Figure-1.

Regarding the aetiology, E. coli was responsible for UTI in 78% children (Table-2).

Table No.1: Symptoms of UTI (n=50)

Symptoms	Patients age		Total
	1-3 Years (28)	>3 years (22)	
Fever	25(89.3%)	17 (77%)	42(84%)
Urine frequency	07 (25%)	09 (41%)	16(32%)
Vomiting	08 (28%)	07 (32%)	15(30%)

Table No.2: Aetiology of the UTI (n=50)

Aetiology	No. of children	%age
E. coli	39	78.0
Klebsiellae	04	04.0
S. saprophyticus	02	04.0
P. aeruginosa	02	04.0
S. facalis	02	04.0
Proteus	01	02.0

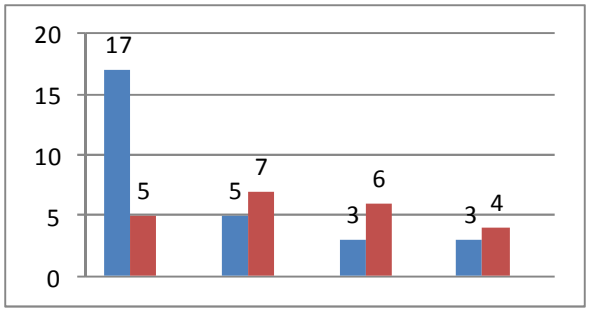

Figure No.1: Abdominal tenderness (n=50)

DISCUSSION

The common symptoms noted in present study were fever 84%, urinary frequency 32% and vomiting 30%. In a study it has been reported that fever 92%, dysuria 68% and failure to thrive 31%[5]. Fever in 73.3%, failure to thrive 46.6%, vomiting and pallor (40% each were the most common presentations in another study[8]. Ahmad et al have found fever the most common presentation (78%) followed by pain abdomen 54% and dysuria 40% in patients of UTI[9], while to thrive was observed 1in 12% of patients. Ahmadzaden et al have reported fever 83% and dysuria 48% in patients of UTI in the study[10].

In a study it is reported that 48% of the patients did not have any pain[5]. Others presented with generalized abdominal pain 21, lumber tenderness 18% and hypogastric pain 13% in descending order of frequency. Similar findings were observed in other study[11].

S. saprophyticus was found 4% in present study. It was 14.9%, 10-15% in other studies[12]. P. aeruginosa was found 4% in [resent study. In present study of 50 children the ratio of female to male was 3.2:1. In a study, female to male ratio in the patients of UTI up to the age of 7 years was found 4.9:1[13]. It was found 16.7% and 9% respectively in other studies[14].

It was found that single and multidrug resistance to ampicillin, amoxicillin, cefazolin, ciprofloxacin, nitrofurantoin and co-trioxazole were found on all specimens of UTI patients. The E. coli resistance to ampicillin peaked in toddlers (52.8%) but was high in infants 50.4%. the most common co-resistance in all age groups was ampicillin/co-trimoxazole[15]. In another study E.coli had a resistance rate of more than 50% to ampicillin, amoxicillin, co-trimoxazole, cephradine andfosfomycin, but a very low resistance rate (<4%) to 3rd generation cephalosporin, nitrofurantoin, azactum and amikacin[16]. I a study conducted, trimethoprim resistance was found 15.2% overall, with a resistance rate for E. coli to trimethoprim was 17.7%. Rates of antibiotic resistance for all organisms to nitrofurantoin (2.9%) and norfloxacin 0.9%) remain low[17]

CONCLUSION

It is concluded from study that UTI is more common in females between the age of 204 years mostly due to problems in their toilet training.

REFERENCES

1. Khan PA, Kundi MZ, editors. Basic of paediatrics. Multan. Carvan Book Centre; 2002.p.378-409.
2. Asharam K, Bhimma R, Adhikari M, Human immunodeficiency virus and UTI in children. Ann Trop Paediatr 2003; 23: 273-7.
3. Qureshi AM. Organisms cauring UTI in pediatric patients. J Auyb Med Coll 2005; 17: 72-4.
4. Huicho L, Campos SM, Alamo C. Meta analysis of urine screening tests for determining the risk of UTI in children. Paediatr Infect Dis J 2002;21:1-11
5. Qureshi AM. Clinical presentation of UTI among children. J Auyb Med Coll 2005; 17: 79-81.
6. Elder JS, Urologic disorders in infants andchildren. In: Behraman RE, Kleigman RM, Jenson HD editors. Nelson's textbook of pediatrics. 17th ed. Philadelphia: WB Saunders; 2004.p.1783-1826.
7. Lizama CM, Luco IM, Reichard TC, Hirsch BT. UTI in a pediatrics emergency department. Rev Chilena Infectol 2005; 22:235-41.
8. Hafeez F, Anwar S, Ahmad TM. UTIin children. Pak Paed Med J 2005; 29: 35-40.
9. Ahmad A, Hussain W, Waqar S, Khan A. Presenting features of UTI in children. Pak Paed J 2006; 30: 91-4.
10. Ahmadzadeh A, Askarpour S. Asociation of urinary tract abnormalities in children. Pak J Med Sci 2007; 23: 89-91.
11. Gallager SA, Hemphill RR. UTI,epidemiology, detection and evaluation. [online]. 2003 [cited 2008 March 21.
12. Ronald A. The etiology of UTI. Dis Mon 2003; 49:71-82.
13. Williams GJ, Wei L, Lee A, Craig JC. Long term antibiotics for preventing recurrent UTI in children. Cochrane Database Syst Rev 2001;(4): CDOO 1534.
14. Sobczyk D, Krynicki T, Blumczynski A, Zaniew M, Kroll P, Siwinska A, et al. New, successful treatment of UTI. Przegl Lek 2006; 63: 140-1.
15. Gaspari RJ, Dickson E, Karlowsky J, Doern G. Multidrug resistance in pediatric UTI. Microb Drug Eesist 2006; 12: 126-9.
16. Fan SY, Zhang BL, Wang WH, Zhang X. Bacterial pathogens and resistance patterns in community acquired pediatric UTI. Zhongguo Dang Dai Er Ke Za Zhi 2006;8: 115-7.
17. Mangin D, Toop L, Chambers S, Ikram R, Harris B. Increased rates of trimethoprim resistance in uncomplicated UTI. N Z Med J 2005; 118: 1726-9

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Original Article

Hep. B&C in Oral Surgery

Prevalence of Hepatitis B and C in Oral & Maxillofacial Surgery reported at Liaquat University Hospital Hyderabad

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ABSTRACT

Objective: To analyze the prevalence of hepatitis B virus (HBV) and hepatitis C virus (HCV) carriers in oral and maxillofacial patients.

Study Design: Experimental study.

Place and Duration of Study: This study was carried out at Oral & Maxillofacial Surgery Department, Liaquat University Hospital Hyderabad from 1st September 2011 to 31st August 2013.

Materials and Methods: Data of 520 patients who were hospitalized at Liaquat University Hospital for treatment of maxillofacial fractures. Study design was descriptive/cross sectional study. All patients were treated both under general anesthesia as well as local anesthesia, sedation. Our hospital is tertiary referral center for Sindh province. Patients who were hospitalized at Oral & Maxillofacial Surgery Department during the study period for any category of maxillofacial surgery were screened before managing.

Results: 60% were males and 40% were females with age from 15-80 years. HBV was positive 15% in patients and HCV was positive in 11% of patients.

Conclusion: The high prevalence of HBV and HCV in maxillofacial surgical patients recommended a regular test for HBV and anti-HCV for every one patient, to prevent spread of HBV and HCV among staff, patient to patient and oral surgeon.

Key Word: Maxillofacial, HBV, HCV

INTRODUCTION

Viral hepatitis is a severe worldwide community healthiness trouble. At current, six diverse types of hepatitis virus have been recognized and called as hepatitis A, B, C, D and E[1]. It is predictable that three to four million persons are infected each year. Pakistan is the intermediate HBV prevalence zone with carrier rate of 3-4% where both HBV and HCV are emerging as a major health problem[2], more than 2000 million populations global and 350 million people are carrier of the virus by the presence of HBSAG surface antigen[2]. 130 million are chronic HCV carriers and are at risk of heaptocellular carcinoma[3]. Examination of maxillofacial surgical patients for hepatitis B and C undergo maxillofacial surgery is regular set of rules at maxillofacial department civil hospital Hyderabad. Universal precautions against HBV and HCV are not in use only when a known positive case operated. Patient under departing in Oral & Maxillofacial Surgery, must use standard practice of cross infection control to stop extend of infectivity to community.

This study was carried out to see the occurrence of HBV and HCV in oral and maxillofacial surgical patients before operating on them.

MATERIALS AND METHODS

We carried out this study Descriptive / cross-sectional Oral and maxillofacial surgery department of this university deals in all Indoor admitted of maxillofacial surgical patients. Over a period of two year starting from 1st Sept, 2009 to 31st Aug 2011. A total of 520 patients were admitted and treated both under general anesthesia as well as local anesthesia, sedation. All patients screened for HBsAg and anti- HCV to notice the carrier standing of the patients earlier than surgery. Every single one having the HBV and HCV positive patients were referred to general medicine department to consult physician liver function tests (L F T) SGOT SGPT, ALT and BT. CT PT, APTT before treatment subject to fitness general anesthesia and under local anesthesia for any type of minor or major surgical procedure. All relative information was collected through annual admission register and patient treatment files and noted on predesigned proforma. Data was analyzed through SPSS-17.

RESULTS

A total number of 520 patients were screened for HBsAg and anti-HCV. 315(60%) were males and 205(40%) were females. The age was from 15 to 80 years. 139(26%) were positive for HBsAg and HCV. HBsAg were positive in 79(15%) patients. Out of them

49(62%) were males and 30(35%) were females. HCV was positive in 60(11%) patients, 40(66%) males and 20(33%) females. Total cases 56(40%) patients had prior history of surgical procedures as indoor or outdoor case. Only 23(4%) patients knew about their hepatitis status, while a bulk of patients 106(76%) were not known of their hepatitis position before they admitted to civil hospital Hyderabad oral maxillofacial department and they were diagnosed on screening by ELISA method. All the recently diagnosed cases of hepatitis B and C were also referred to Medicine Department of Liaquat University Hospital for further Evaluation.

Table No.1:Prevalence of Hepatitis B virus n=520 patient

Hepatitis B Virus	No of Patient			
	Male	Female	Total	%age
Present	49	30	79	15%
Absent	266	175	441	84%

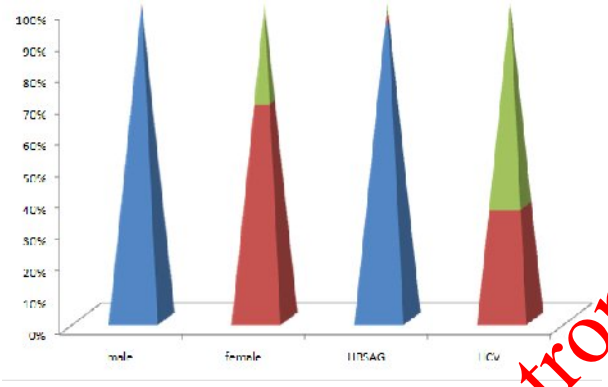

Figure No.1: Different Patients Ratio

Table No.2: Prevalence of Hepatitis C Virus n=520 patients

Hepatitis C Virus	No of Patient			
	Male	Female	Total	%age
Present	40	2O	60	11%
Absent	34I	321	381	73%

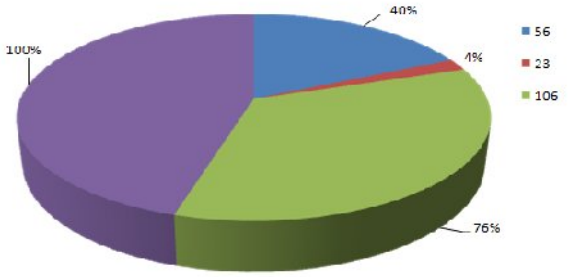

Figure No.2: Distribution of patient previous surgical procedure.

DISCUSSION

Viral hepatitis has been diagnosed by coincidence in hospital based admitted impatient individuals who has no history and symptom of hepatitis[3,4].

Hepatitis B (HBV) and C (HCV) viral infection are spread all the way during blood and body secretions which break during the human body from side to side a contravene in the skin, mucosa or vein. The most common routes of conduction of HCV in urbanized country take account of intravenous drug use, blood transfusions, haemodialysis, needle-stick injuries, tattooing, sexual intercourse and peri-natal infections[5,6.13].

In mounting countries, beneficial injections from reuse needles and syringe and indecent sterilization of all-encompassing medical procedure is the major means of transportation for spread of blood borne organisms together with hepatitis B virus HBV, HCV and HIV. And Overuse and unsafe injection[7,8.14].

Hospital based Maxillofacial surgery are at high jeopardy of getting the hepatitis B and C virus, since they have extended surgical operation uncovered to the virus whereas, from perforation of glove, wire stick injury, accidental pricks. Low quality glove and extend used of glove more than one hour in surgical field [9.15.16].

The occurrence of hepatitis in exacting is established to be elevated in public sector hospital due to over load patient admission[10]. A study carried out by Mujeeb et al[10.17.18] showed the frequency of HBsAg 7% in doctors, 17% among dentists and 20% in sweepers working in the hospitals. On the other last part , there is accepting of hepatitis B and C infection and carelessness while dealing operating and proper dispose off material among the health care profession.

In this study the frequency of HBV infection was to be 11% compared to 6.5% diagnosed in a tertiary care hospital of Karachi in the surgical patients[5.19.20]. A study carried out in the surgical out patients department in 2006 Fauji Foundation Hospital Rawalpindi established 2.28% prevalence of hepatitis B and 7.56%[11]. At the other hand , has been a prove that known patient at high risk spreading for hepatitis B and C among clinical staff and society while dealing and operating patient[11,12.21.22]. What measures should to be taken to stop spread infection .like proper handling of instrument and glove should be used to deal any patient. And clinical staff must be trained dispose off material. Yet, the question of whether and how contaminated individuals should be arrangement out .to prevent spread of Infection and diagnosed and refer to proper treatment protocol.

CONCLUSION

The high prevalence of hepatitis B and C found in maxillofacial surgical patient recommend each and every patient assume having hepatitis and should take routine screening of HBsAg and anti-HCV .prior to any surgical procedure. This will allow to implement of universal precautions to transmission of infection HBSAg. HCV both, patient to clinical staff & patient to surgeon as well as to public and society.

REFERENCES

1. Khokhar N, Gill ML, Malik GJ. General seroprevalence of hepatitis C and hepatitis B virus infections in population, J Coll Physicians Surg Pak 2004; 14: 534-6.
2. Tariq WZ, Akram S, Qureshi TZ. Frequency of hepatitis B and C in central Punjab. Pak J Pathol 2006; 17: 140-1.
3. Khan AJ, Luby SP, Fikree F, Karim A, Obaid S, Dellawala S,et al, Unsafe injections and the transmission of hepatitis B and C in a periurban community in Pakistan. Bull World Health Organ 2000; 78: 956-63.
4. Ijaz AU, Shafiq F, Toosi NA. Hepatitis B and hepatitis C in blood donors: analysis of 2-years data. Ann King Edward Med Coll 2007; 13: 59-61
5. Aziz S, Memon A, Tily HI, Rasheed K, Jehangir K, Quraishy MS. Prevalence of HIV, hepatitis B and C \amongst health workers of Civil Hospital Karachi. J Pak Med Assoc 2002; 52: 92-4.
6. Mujeeb SA. Prevalence of HBs Ag and HCV antibodies in hepatocellular carcinoma in Karachi. Trop Doctor 1996; 27: 297.
7. Winsome CJ, Lee RJ. Increased seroprevalence of hepatitis B in dental personnel necessitates awareness of revised pediatric hepatitis B vaccine recommendations. J Public Health Dent 1993; 53:231-4.
8. Chaudhary IA, Khan SA, Saminullah should we do hepatitis C screening on each patient before surgery; Analysis of 142 cases. Pak J Med Sci 2005;21:278-80.
9. Thomas DL, Gruninger SX, Siew C, Jov ED, Quinum TC. occupational risk of hepatitis C infections among general dentist and oral surgeons in North America. Am Med 1996; 1:564-9S
10. Mujeeb SA, Zubari SJ, Lodhi TZ, Mehmood K. prevalence of HBV infection in health care personals. J Pak Med Assoc 1994;44:265.
11. Takata Y. Tominaga K, et al. prevalence of hepatitis viral infection in dental patient with impacted teeth or jaw deformatie. Oral Surg Oral Med Oral Patho Oral Radio Endod 2003;96:31.
12. Chaudhary IA. Khan SS, Majrooh MA, Alvi AA. Seroprvalence of hepatitis B and C among the patient reporting in surgical OPD at Fouji Foundation Hospital Rawalpindi. Review of 5 year literature.P512
13. Stein K, Dalziel K, Walker A, Jenkins B, Round A, Royle P. Screening for Hepatitis C in injecting drug users: a cost utility analysis. J Public Health (Oxf) 2004, 26:61-71.
14. Stein K, Dalziel K, Walker A, Jenkins B, Round A, Royle P. Screening for hepatitis C in genito-urinary medicine clinics: a cost utility analysis. J Hepatol 2003.
15. Stein K, Dalziel K, Walker A, McIntyre L, Jenkins B, Horne J, et al. Screening for hepatitis C among injecting drug users and in genitourinary medicine clinics: systematic reviews of effectiveness, modelling study and national survey of current practice. Health Technol Assess, 2002.
16. Eckman MH, Kaiser TE, Sherman KE. The cost-effectiveness of screening for chronic hepatitis B infection in the United States.Clin Infect Dis 2011.
17. Loubiere S, Rotily M, Moatti JP. Prevention could be less cost-effective than cure: the case of hepatitis C screening policies in France Int J Technol Assess Health Care 2003;19:632-645.
18. Singer ME, Younossi ZM. Cost effectiveness of screening for hepatitis C virus in asymptomatic, average-risk adults. Am J Med 2001;111:614-621.
19. Tormans G, Van Damme P, Carrin G, Clara R, Eylenbosch W. Cost-effectiveness analysis of prenatal screening and vaccination of hepatitis B virus - the case of Belgium. Soc Sci Med 1993, 37:173-181.
20. Jordan R, Law M. An appraisal of the efficacy and cost-effectiveness of antenatal screening for hepatitis B. J Med Screen 1997;4:117-127.
21. Dwyer MJ, McIntyre PG. Ante-natal screening for hepatitis B surface antigen: an appraisal of its value in a low prevalence area. Epidemiol Infect 1996; 117:121-131.
22. Gogos CA, Fouka KP, Nikiforidis G, Avgeridis K, Sakellaropoulos G, Bassaris H, et al. Prevalence of hepatitis B and C virus infection in the general population and selected groups in South-Western Greece. Eur J Epidemiol 2003;18:551-55.

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Original Article

Diabetes and Central Obesity

Relationship between Type 2 Diabetes Mellitus and Central Obesity

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ABSTRACT

Objectives: To determine the relationship between type 2 diabetes and central obesity, we investigated the incidence of type 2 diabetes in people visiting the opd of hamdard medical hospital.We also investigated the independent effects of central obesity compared with those of overall obesity
Study Design: Comparative study
Place and Duration of Study: This study was conducted at Hamdard University Hospital between October 2012 to September 2013
Material and Methods: The subjects were 174 men and 261 women selected from 469 people who had undergone medical examinations at OPD of hamdard medical college between 2012 till 2013.Participants with central obesity were determined according to the new criteria announced by the IDF[9]. Central obesity in south east population is defined by the IDF as waist circumference ≥90 cm for men and ≥90 cm for women. Participants with overall obesity were defined as those with BMI ≥25.0 kg/m^2
Results: The results of logistic regression analysis showed that both central obesity and overall obesity were closely related to type 2 diabetes and that the relative risks of occurrence of type 2 diabetes adjusted for age, sex, systolic blood pressure, total cholesterol, and smoking were 2.59 for central obesity and 2.06 for overall obesity. Central obesity maintained its significance when additionally adjusted for overall obesity, but overall obesity lost its significance when additionally adjusted for central obesity
Conclusion: In conclusion, our study suggested that the current cutoff points of waist circumference in the IDF definition for Asian population is useful for assessing the risk of type 2 diabetes and that central obesity may be more useful than overall obesity for evaluating the risk of type 2 diabetes.
Key Word: Type 2 Diabetes Mellitus, Central Obesity, Cholesterol, Smoking

INTRODUCTION

The development of obesity, particularly abdominal obesity, promotes insulin resistance and a cluster of risk factors for CV disease, including hypertension, atherogenic dyslipidaemia, inflammation, and altered haemostasis.[1-2] Abdominal obesity and type 2 diabetes often coexist,[3-4]and patients with type 2 diabetes are well known to be at elevated risk of first or repeat CV events, compared with their non-diabetic counterparts.[5] However, the elevated CV risk associated with insulin-resistant states begins long before patients present for a clinical diagnosis of type 2 diabetes.[6] The purpose of this review is to explore the relationships between abdominal obesity and insulin resistance.
The prevalence of abdominal obesity, according to IDF criteria (waist circumference >90 cm for men and >80 cm for women[9]) is also high and growing and so as incidence of diabetes mellitus type 2. In an NHANES cohort recruited between 1998 and 1994, 30.1% of men had abdominal obesity; by 1999–2000, the prevalence of this cardiometabolic risk factor had increased to 36.0% (an increase in prevalence of 20%).[7] A comparable increase in the prevalence of abdominal obesity was observed in women during this period, from 45.7 to 51.9% (increase in prevalence of 14%). These overall figures conceal potentially important differences between ethnic groups.[8]. Most cases of the metabolic syndrome and diabetes mellitus type 2 that physicians will encounter in their daily practice are likely to be associated with abdominal obesity. A prospective study in a consecutive series of 756 men or women undergoing coronary angiography evaluated the prognostic significance of abdominal obesity (waist circumference or waist-hip ratio) and BMI, with regard to clinical outcomes.[10]

MATERIALS AND METHODS

The subjects were 174 men and 261 women selected from 469 citizens who had undergone medical examinations at OPD of hamdard medical college between 2012 till 2013.The following participants in medical examinations were excluded: those with missing data on blood pressure or waist circumference and those with type 2 diabetes (fasting plasma glucose level ≥126 mg/dl and/or those who were on medication for diabetes).Participants with central obesity were determined according to the new criteria announced by the IDF[9] for south asian . Central obesity is defined by the IDF as waist circumference ≥90 cm for men and ≥80 cm for women. Participants with overall obesity were defined as those with BMI ≥25.0 kg/m^2 [11]The participants were divided into two groups, a normal

group and a central obesity group, and the measured items in the two groups were compared. We also compared the incidences of type 2 diabetes in normal and central obesity groups of subjects who were newly determined as having type 2 diabetes on the basis of data obtained from medical examinations conducted in 2003 or 2004. Moreover, we estimated the relative risk of type 2 diabetes in people with central obesity compared with those who did not have central obesity.As another analysis, the participants were divided into two groups, a normal group and an overall obesity group, and the same assessments as those described above were made for these two groups.

The SPSS package (version 11.5J) was used for statistical analysis. The χ^2 test was used for frequency comparison. Multiple logistic regression analysis was used to estimate the relative risk for type 2 diabetes. The significance level of all analyses was set at $P < 0.05$.

RESULTS

Ninteen of the 327 individuals in the normal group and 14 of the 87 individuals in the central obesity group were newly defined as having type 2 diabetes. The incidence of type 2 diabetes was significantly higher in the central obesity group than in the normal group (15.6 vs. 5.8%; $P < 0.0001$). Eighteen of the 296 individuals in the normal group and 15 of the 118 individuals in the overall group were newly defined as having type 2 diabetes . The incidence of type 2 diabetes was significantly higher in the overall obesity group than in the normal group (12.7 vs. 5.9%; $P < 0.0001$).

The results of logistic regression analysis showed that both central obesity and overall obesity were closely related to type 2 diabetes and that the relative risks of occurrence of type 2 diabetes adjusted for age, sex, systolic blood pressure, total cholesterol, and smoking were 2.59 for central obesity and 2.06 for overall obesity (Table 2). Central obesity maintained its significance when additionally adjusted for overall obesity, but overall obesity lost its significance when additionally adjusted for central obesity (Table 3).

Table No.1: (Adjusted for age and sex)

Central obesity	2.84 (1.54–5.25)†
Overall obesity	2.30 (1.37–3.85)†

Table No.2: (Adjusted for age and sex + total cholesterol, systolic blood pressure, and smoking)

Central obesity	2.59 (1.39–4.81)†
Overall obesity	2.06 (1.20–3.54)†

Table No.3: (Adjusted for age and sex + total cholesterol, systolic blood pressure, and smoking + overall obesity or central obesity)

Central obesity	2.07 (1.03–4.16)‡
Overall obesity	1.53 (0.83–2.83)

* Relative risk of central obesity was adjusted for overall obesity (yes/no) and that of overall obesity was adjusted for central obesity (yes/no). The results of logistic regression analysis showed that both central obesity and overall obesity were closely related to type 2 diabetes (Table 1 and 2). Central obesity maintained its significance when additionally adjusted for overall obesity, but overall obesity lost its significance when additionally adjusted for central obesity (Table 3)

† $P < 0.01$; ‡ $P < 0.05$.

DISCUSSION

Waist circumference is a better predictor of visceral fat (assessed using advanced techniques such as dual-energy X-ray absorptiometry and computed tomography) than BMI and waist-to-hip ratio[12 13 14]. There is a strong association between waist circumference and risk of developing health conditions such as cardiovascular disease and type 2 diabetes[15 16 17 18 19]. In our study, only central obesity remained a significant predictor of risk of type 2 diabetes when central obesity and overall obesity were included in the model simultaneously.The IDF also announced a new definition of metabolic syndrome in 2005, and according to the new definition, for a person to be defined as having metabolic syndrome he or she must have central obesity assessed by waist circumference[17]. Since there are some ethnic or country-specific differences in cutoff points of waist circumference, ethnic and country-specific cutoff points have been separately established in the IDF definition on the basis of results of various epidemiological studies.South asian cutoff points have also been independently established in the IDF definition (waist circumference ≥90 cm for men and ≥80 cm for women)..Controversy remains regarding the cutoff points for waist circumference that should be used in clinical practice. The influence of abdominal fatness on health risks such as risk of type 2 diabetes is a continuous one, and any cutoff point is therefore arbitrary[20]. Further epidemiological data must be obtained in each country to determine the appropriate country-specific cutoff points for assessing the risk of type 2 diabetes.

CONCLUSION

The study suggested that the current cutoff points of waist circumference in the IDF definition are useful for assessing the risk of type 2 diabetes and that central obesity may be more useful than overall obesity for evaluating the risk of type 2 diabetes.

REFERENCES

1. DeFronzo RA, Ferrannini E. Insulin resistance: a multifaceted syndrome responsible for NIDDM, obesity, hypertension, dyslipidemia, and

atherosclerotic cardiovascular disease. Diabetes Care 1991; 14: 173–194.
2. Haffner SM. Insulin resistance, inflammation, and the prediabetic state. Am J Cardiol 2003; 92: 18J–26J.
3. Okosun IS, Dever GE. Abdominal obesity and ethnic differences in diabetes awareness, treatment, and glycemic control. Obes Res 2002;10: 1241–1250.
4. Okosun IS, Chandra KM, Choi S, Christman J, Dever GE, Prewitt TE. Hypertension and type 2 diabetes comorbidity in adults in the United States: risk of overall and regional adiposity Obes Res 2001; 9: 1–9.
5. Haffner SM, Lehto S, Ronnemaa T, Pyorala K, Laakso M. Mortality from coronary heart disease in subjects with type 2 diabetes and in nondiabetic subjects with and without prior myocardial infarction. N Engl J Med 1998; 339: 229–234.
6. Unwin N, Shaw J, Zimmet P, Alberti KG. Impaired glucose tolerance and impaired fasting glycaemia: the current status on definition and intervention. Diabet Med 2002; 19: 708–723.
7. Ford ES, Giles WH, Mokdad AH. Increasing prevalence of the metabolic syndrome among US adults. Diabetes Care 2004; 27: 2444–2449.
8. Ford ES, Giles WH, Dietz WH. Prevalence of the metabolic syndrome among US adults: findings from the third National Health and Nutrition Examination Survey. JAMA 2002; 287: 356–359.
9. International Diabetes Federation: The IDF consensus worldwide definition of the metabolic syndrome [article online].. Accessed on 23 January 2006
10. Hoefle G, Saely CH, Aczel S, Benzer W, Marte T, Langer P, Drexel H. Impact of total and central obesity on vascular mortality in patients undergoing coronary angiography. Int J Obes (Lond) 2005; 29: 785–791.
11. Matsuzawa Y, Inoue S, Ikeda Y, Sakata T, Saitoh Y, Satoh Y, et al. The new diagnostic criteria of obesity (in Japanese). Journal of Japan Society for the Study of Obesity 2000;**6**:18–28.
12. Rankinen T, Kim SY, Perusse L, Despres JP, Bouchard C. The prediction of abdominal visceral fat level from body composition and anthropometry: ROC analysis. Int J Obes Relat Metab Disord 1999;23:801–809.
13. Taylor RW, Keil D, Gold EJ, Williams SM, Goulding A. Body mass index, waist girth, and waist-to-hip ratio as indexes of total and regional adiposity in women: evaluation using receiver operating characteristic curves. Am J Clin Nutr 1998;**67**:44 –49.
14. Wang Y, Rimm EB, Stampher MJ, Willet WC, Hu FB. Comparison of abdominal adiposity and overall obesity in predicting risk of type 2 diabetes among men. Am J Clin Nutr 2005;**81**:555 –563.
15. Wei M, Gaskill SP, Haffner SM, Stern MP. Waist circumference as the best predictor of noninsulin dependent diabetes mellitus (NIDDM) compared with body mass index, waist/hip ratio and other anthropometric measurements in Mexican Americans: a 7-year prospective study. Obes Res 1997;**5**:16 –23.
16. Ledoux M, Lambert J, Reeder BA, Despres JP. Correlation between cardiovascular disease risk factors and simple anthropometric measures: Canadian Heart Health Surveys Research Group. Can Med Assoc J 1997;**157(Suppl. 1)** : S46 –S53.
17. Reeder BA, Senthilselvan A, Despres JP, Angel A, Liu L, Wang H, et al. The association of cardiovascular disease risk factors with abdominal obesity in Canada: Canadian Heart Health Surveys Research Group. Can Med Assoc J 1997; **157(Suppl. 1)** : S39 –S45.
18. Mamtani MR, Kulkarni HR: Predictive performance of anthropometric indexes of central obesity for the risk of type 2 diabetes. Arch Med Res 2005;**36** :581 –589.
19. Yusuf S, Hawken S, Ounpuu S, Bautista L, Franzosi MG, Commerford P, et al. The INTERHEART Study Investigators: Obesity and the risk of myocardial infarction in 27000 participants from 52 countries: a case-control study. Lancet 2005;**366** : 1640 –1649.
20. Stevens J, Couper D, Pankow J, Folsom AR, Duncan BB, Nieto FJ, et al. Sensitivity and specificity of anthropometrics for the prediction on diabetes in a biracial cohort. Obes Res 2001; **9**:696 –705.

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Original Article

Dentistry

Frequency of C-Shaped Canals in Mandibular Permanent Second Molar among Hyderabad Population

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ABSTRACT

Objectives: The objectives of this study were to assess the frequency and configuration of C-shapedcanal in mandibular second molar teeth.

Study Design: Descriptive type of study

Place and Duration of Study: This study was performed at the Dental OPD, Department of Operative Dentistry, Liaquat University Hospital, Hyderabad / Institute of Dentistry, Liaquat University of Medical and Health Sciences, Jamshoro from June 2010 to December 2010.

Materials and Methods: A total of 100 extracted mandibular second molars were collected. The teeth were stored in 0.9% physiological solution (Otsuka Pakistan Ltd:) after extraction. Calculus and the remainder of periodontal tissue were thoroughly removed by a curette. All the samples were then rinsed with tap water and dried with air. Each tooth was opened to gain access of the pulp chamber by a small round bur (Mani, Japan). The pulp chamber was injected with the 0.5% methylene blue (BDH Gurrcertistan chemical Ltd: Poole England). The contrast color penetrated through pulp-down to the pulp orifice of the root canal. All the teeth were resected transversally at the cemento-enamel junction by a thin diamond disc (Mani, Japan) and the crowns were discarded. The canal orifices were located by DG-16 endodontic explorer. The same diamond disc were used for cutting roots transversally into two more sections at middle 3rd and 2mm above the root apex. All these three section were studied under operating microscope (66 vision tech: Co. Ltd: Sozhou, China) for anatomical properties mentioned in objectives.

Results: Thirteen C-shaped canals were found out of 100 mandibular second molars. 03 were of category I & II respectively and 07 were of category III.

Conclusion: The present study demonstrated that mandibular second molar teeth have variations in terms of number of roots, number of canal orifices and canal morphology. Therefore it cannot be assumed that these teeth always have two-roots and three canals. The overall prevalence of C-shaped canal was found 13% in the local population. The difference to other studies may be attributable to racial differences and study model.

Key Words: Canal Configuration, C-shaped Canal,Endodontic Treatment, Mandibular Second Molar

INTRODUCTION

The knowledge of both normal and unusual configuration of the pulp and possible variation is essential for accomplishment of endodontic treatment. and lack of such knowledge may lead to treatment failure.[1,2] The C-shaped canal configuration is one of anatomical variation seen in mandibular second molars and can cause serious difficulties in endodontic treatment. The number of studies demonstrated that C-shaped canals in mandibular second molar vary in numberand shape along the root length, making cleaning, shaping, and obturation of these teeth difficult.[2]

Cooke and Cox (1979)[3] firstly recognized this anatomical variation and was named as C-shaped because of cross sectional morphology at the root and root canal, which resembles the English letter C in shape. In its place of having numerousseparate orifices the pulp chamber of C-shaped molar is a ribbon shaped orifice with a 180º arc starting at the mesiolingual line angle and curving around the buccal side.[3]

Melton et al (1991)[4] classified the C-shaped canals into three types.

Type I: The continuous C-shaped canal.

Type II: The semicolon shaped canal.

Type III: Two discrete and separate canals.

He further added that C-shaped canals could vary in number and shape along the length of the root.

Subdivision-I: C-shaped orifice in the coronal third that divides into two or more discrete and separate canals that join apically;

Subdivision-II: C-shaped orifice in the coronal third that divides into two or more discrete and separate canals in the mid root to the apex;

Subdivision-III: C-shaped orifice that divides into two or more discrete and separate canals in the coronal third to the apex.[4]

There were several studies conducted on the frequency of C-shaped canals in mandibular second molar in different population and reported its occurrence from 2% to 40%.[1,5-11] Some studies also indicate that C-shaped canal is more frequent in Asians.[12]

There is lack of research on the C-shaped canal configuration in our population. The purpose of this study was to assess the frequency of C-shaped canal in our population, which is important to increase the quality and success of endodontic treatment in C-shaped molar teeth.

MATERIALS AND METHODS

This descriptive type of study was performed at the Dental OPD, Department of Operative Dentistry, Liaquat University Hospital, Hyderabad / Institute of Dentistry, Liaquat University of Medical and Health Sciences, Jamshoro from June 2010 to December 2010. The study was conducted on 100 extracted mandibular second molar teeth having non probability (Convenience).

Inclusion Criteria:

- Human mandibular second molars extracted due to periodontal reasons

Exclusion Criteria:

- Fractured teeth
- Grossly carious teeth with root resorption
- Teeth with incomplete root formation
- Endodontically treated teeth

Data Collection Procedure: A total of 100 extracted mandibular second molar were collected from the Dental OPD, Liaquat University Hospital, Hyderabad. The identification of mandibular second molar was confirmed by two independent observers had more than 10 years clinical experience in tooth morphology/ endodontics.

Extracted teeth were stored in 0.9% physiological solution (Otsuka Pakistan Ltd:) after extraction. Calculus and the remainder of periodontal tissue were thoroughly removed by a curette. All the samples were then rinsed with tap water and dried with air.

Each tooth was opened to gain access of the pulp chamber by a small round bur (Mani, Japan). The pulp chamber was injected with the 0.5% methylene blue (BDH Gurr certistan chemical Ltd: Poole England). The contrast colour penetrated through pulp-down to the pulp orifice of the root canal. All the teeth were resected transversally at the cemento-enamel junction by a thin diamond disc (Mani, Japan) and the crowns were discarded. The canal orifices were located by DG-16 endodontic explorer. The same diamond disc was used for cutting roots transversally into two more sections at middle 3rd and 2mm above the root apex. All these three section were studied under operating microscope (66 vision tech: Co. Ltd: Sozhou, China) for anatomical properties mentioned in objective. The data was recorded in pre-design proforma.

Data Analysis: The data was analyzed by using the software SPSS version 11.The frequency and percentage was calculated for C-shaped, non c-shaped canal configuration, number of orifices, roots and root canals. The mean and standard deviation (SD) was calculated for number of orifices, roots and root canals.

RESULTS

Total 100 extracted mandibular second molar teeth were selected based on inclusion and exclusion criteria. Out of 100 teeth, 18(18.0%) were single rooted, 80(80.0%) were two-rooted while 2(2.0%) were three-rooted (Table No.1).

In the current study, according to Melton's classification, 13(13.0%, n = 100) teeth had C-shaped canal in mandibular second molar(Table No. 2). Of these, 03(23.0%, n = 13) had the configuration of C1 and C3 respectively whereas 07(53.84%, n = 13) teeth had the configuration of C2 (Table No. 3).

Table No. 1: Number of roots, canal and c-shaped configuration in mandibular second molar (n = 100)

No. of Roots	No. of Canals				Types of C - Shaped			C - Shaped n = 13
	01	02	03	04	C 1 n = 3	C 2 n = 7	C 3 n = 3	
Single rooted, 18(18.0%)	03	11	04	0	3	5	-	08
Two rooted, 80(80.0%)	0	15	61	04	-	2	3	05
Three rooted, 02(2.0%)	0	0	01	01	-	-	-	0

Table No. 2: Frequency of c - shaped in mandibular 2nd molar (n = 100)

C – Shaped	Frequency	Percentage
C - shaped	13	13.0%
Non c - shaped	87	87.0%

The results of present study showed that out of 18 single rooted mandibular second molars, 3 had one canal, 11 had two canals, and 4 had three canals. Out of 80 two rooted mandibular second molars, 15 had two canals, 61 had three canals and 4 had four canals. Out of 2 three rooted mandibular second molars, 1 had three and four canals respectively (Table No.1).

In this study, the prevalence of C-shaped mandibular second molars was present in 13(13.0%, n = 100) teeth. Out of them, 8 teeth had single rooted and 5 had two roots.

Out of 100 teeth, 03 had one orifice, 26 had two orifices, 3 orifices were seen in 66 teeth and 5 teeth had four orifices (Table No.4).

Table No. 3: Configuration of c - shaped according to melton's classification (n =cong 13)

Types of C – Shaped	Frequency	Percentage
C 1	03	23.0%
C 2	07	53.84%
C 3	03	23.0.%

Table No. 4: Number of orifices in mandibular second molar (n = 100)

Number of Orifices	Frequency	Percentage
1	03	3.0%
2	26	26.0%
3	66	66.0%
4	05	05.0%

DISCUSSION

C-shaped canal is one of the most challenging situations while during performing endodontic treatment. It wasactually the Keith (1908) who first described this unusual anatomical variation and latter Cook and Cox (1979) demonstrated it more clearly and also described its various categories. The C-shapedconfiguration of the root canal develops as result of partial or complete merging of roots. As this merging process does not necessarily involve all the roots so resulting in the development of a shape resembling a large letter "C", but it can also resemble a small letter "c" which can be found in one or both canals.[3]

According to Cooke & Cox (1979) it was difficult to detect C-shaped canals on the preoperative radiograph. So, in current study an in-vitro method was selected to investigate the C-shaped canal in mandibular second molars. All root canals that conformed to the general structure of a 'C' and occurred in a C-shaped root were described as C-shaped root canals.[3]

The classification system of canal types described by Meltonet al. (1991) was used to describe the canal system in C-shaped roots. In type I canal, a single canal is present from orifices to the apex; this has been described as a true C-shaped canal.[4]

Previously reported differences in the root-canal anatomy of mandibular second molars may be due to difference in the study population from which the teeth were chosen. In Caucasian population the two rooted mandibular second molars were predominantly seen in different studies by Ainamo & Loe (1968), Tamse & Kale (1981),Vertucci[13](1984) and Weine et al.[6](1988), whereas in Asian or Mongoloid population the higher number of single-rooted mandibular second molars were found by Kotoku[11](1985). But In present study 18% of mandibular teeth were found single-rooted, 80% were double-rooted where as only 2% were having three roots. A radiographic study[6] by Weine et al. (1988) reported three single-rooted specimens one to have a single canal and two to have C-shaped, and photographs from another study[14] by Walker RT (1988) of selected specimens clearlyshowed the complex anatomical characteristic of single-rooted specimens. In the current investigation, a variety of canal types was found, the total 13 teeth out of 100 found with C-shaped configuration from which 3 were of category I & II respectively and 07 were category III. Manning[15] (1990) also reported that category III systems occurred most frequently, which is in agreement with this study.

Manning[15] (1990) found that, amongst 19 teeth, three (10%) had true C-shapes. Haddad et al.[8] (1999) reported that true C-shaped canals with a single canal, occurred most frequently.

Melton et al.[4] (1991) reported that the C-shaped canals had various configurations at different root levels; this was particularly true in all category III Canals. The incidence of C-shaped canals in the mandibular second molars, the findings of this study were in good accord with those of other recent studies using various techniques.

In this study the number of the orifices was also observed regardless of their shape at the level of the floor of the pulp chamber out of 100 teeth, 03 had one orifice, 26 had two orifices, 3 orifices were seen in 66 teeth and 5 teeth had 4 canals.

The frequency obtained in this investigation (10.6%)lies between the 31.5% frequency reported by Yang et al.[7](1988) and the 2.7% frequency reported by Weine et al.[6](1988).The geographical position of Pakistan in particular and the south East, in general, may be the explanation for this phenomenon. However, further studies would be necessary to confirm this phenomenon.

CONCLUSION

The present study demonstrated that mandibular second molar teeth have variations in terms of number of roots, number of canal orifices and canal morphology. Therefore it should not be assumed that these teeth always have two-roots and three canals. The overall prevalence of C-shaped was found 13% in the local population. The difference to other studies may be attributable to racial differences and study model.

REFERENCES

1. Rahimi S, Shahi S, Lotfi M, Zand V, Abdolrahimi M, Es'haghi R. Root canal configuration and the prevalence of C-shaped canals in mandibular second molars in an Iranian population. J Oral Sci 2008;50(1):9-13.
2. Cohen S, Burns RC. Pathways of the pulp. 9th ed, Mosby: St Louis; 2006.

3. Cooke HG, Cox FL.C-shaped canal configurations in mandibular molars. J Am Dent Assoc 1979; 99(5):836-9.
4. Melton DC, Krell KV, Fuller MW. Anatomical and histological features of C-shaped canals in mandibular second molars.J Endod 1991; 17(8):384-8.
5. Weine FS. The C-shaped mandibular second molar: incidence and other considerations. Members of the Arizona Endodontic Association. J Endod 1998;24(5):372-5.
6. Weine FS, Pasiewicz RA, Rice RT. Canal configuration of the mandibular second molar using a clinically oriented in vitro method. J Endod 1988;14(5):207-13.
7. Yang ZP, Yang SF, Lin YC, Shay JC, Chi CY. C-shaped root canals in mandibular second molars in a Chinese population. Endod Dent Traumatol 1988;4(4):160-3.
8. Haddad GY, Nehme WB, Ounsi HF. Diagnosis, classification, and frequency of C-shaped canals in mandibular second molars in the ×Lebanese population. J Endod 1999;25(4):268-71.
9. Al-Fouzan KS. C-shaped root canals in mandibular second molars in a Saudi Arabian population. Int Endod J 2002;35(6):499-504.
10. Jin GC, Lee SJ, Roh BD. Anatomical study of C-shaped canals in mandibular second molars by analysis of computed tomography. J Endod 2006; 32(1):10-3.
11. Kotoku K.Morphological studies on the roots of ×Japanese mandibular second molars.Shikwa Gakuho 1985;85(1):43-64.
12. Jafarzadeh H, Wu YN. The C-shaped root canal configuration: a review. J Endod 2007;33(5): 517-23.
13. Vertucci FJ. Root canal anatomy of the human permanent teeth. Oral Surg Oral Med Oral Pathol 1984;58(5):589-99.
14. Walker RT. Root form and canal anatomy of mandibular second molars in a southern ×Chinese population. J Endod 1988;14(7):325-9.
15. Manning SA. Root canal anatomy of mandibular second molars. Part II. C-shaped canals. Int Endod J 1990;23(1):40-5.

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Original Article

PAD in Diabetic

Frequency of Peripheral Arterial Disease in Diabetic Patients by Ankle Brachial Index

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ABSTRACT

Objective: To determine the frequency of peripheral artery disease (PAD) in diabetic patients by assessing ankle brachial index (ABI).

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted in the Department of Medicine, Abbasi Shaheed Hospital for a period of six month from September 2011 to March 2012.

Materials and Methods: All type 2 diabetics of more than two years disease duration, on treatment, of either gender, were included between 41 years to 70 years of ages. Peripheral artery disease was assessed by ankle brachial index (ABI). Frequency and percentages were presented for gender, smoking status, family history of type 2 diabetes and PAD. Mean and standard deviation was presented for age of patients, duration of diabetes and smoking status.Chi square test was used to compare relative frequencies.

Results: A total of 125 patients were included with a mean age of 57.10 $\pm$ 8.77 years. 68 (54.4%) were female. Mean duration of diabetes was 4.62 $\pm$ 2.21 years. PAD was found in 74 (59.2%) while 51 (40.8%) patients were free from PAD.

Conclusion: A high frequency of PAD was detected in the diabetic subjects with a female pre-ponderance, with statistically significant association with increasing age, hypertension and duration of diabetes.

Key Words: Peripheral artery disease, ankle brachial index, diabetes mellitus

INTRODUCTION

The term peripheral artery disease (PAD) broadly includes the vascular disease and is common in diabetic patients. The frequency of PAD in Pakistan is 5.5%.[1,2] However its prevalence depends on the diagnostic method applied. There is some evidence that PAD is under diagnosed and that risk factor management is suboptimal in those most at risk. The prevalence of diabetes for all age groups worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030.[3] The prevalence of diabetes in Pakistan, according to world health organization (WHO) criteria is 8.6%, 11.1% and 13.9% in the provinces of Balochistan, Khyber pakhtoon Khwan (KPK) and Sindh respectively.[4,5,6] The prevalence of diabetes in the urban versus rural areas was 6% in men and 3.5% in women against 6.9% in men and 2.5% in women respectively.[7]

In Pakistan diabetic patients showed 44.6% prevalence of macrovascular complications and 4% foot ulcer.[8] The term PAD broadly comprises the vascular disease and is common in diabetic subjects, the frequency of PAD in Pakistan is 5.5%.[1,2]

ABI is the ratio of ankle and arm blood pressure, is the single most non-invasive, convenient and cost effective tool for the diagnosis of PAD.[9] An ABI of < 0.9 is 95% sensitive and 99% specific for angiographically documented PAD.[10]

This study is done to detect the magnitude of subclinical forms of PAD in Pakistan by using hand held Doppler which may reveal early manifestation of arterial disease.

Atherosclerosis is a process affecting different vascular beds.[11] PAD is defined as atherosclerosis in arteries distal to the aortic bifurcation with or without symptoms in the legs.

The PAD prevalence has been determined in many studies and is reported to be in range of 15-20% in persons over 70 years old.[12] Few studies however, are truly population based and data is lacking for some PAD stages as well as prevalence data for women. While the majority of elderly individuals in most western societies are women, most early studies enrolled only men. These results cannot automatically be extrapolated to women, in a similar way as the data for middle aged cohorts are not applicable for elderly. Furthermore, the risk factor that is well described for coronary arterial disease (CAD) is the same for men and women and all stages of PAD.

MATERIALS AND METHODS

This study was conducted in the department of Medicine in Abbasi Shaheed Hospital for a period of six months from September 2011 to March 2012. This was a hospital based descriptive cross-sectional study with non-probabilty consecutive sampling.

Proportion of peripheral arterial disease is 5.5%[1] confidence interval 95%, marginal error 4%. The

required sample size came to be 125 diabetic patients by WHO sample size calculator[13].

Patients with type 2 diabetes of more than 2 years duration on treatment with either gender of age range between 41 – 70 years were included in the study.

Patients having proven PAD or not consenting to be included in the study were excluded.

All type 2 diabetics visiting the outpatient department consenting and fulfilling the inclusion criteria were enrolled in the study. Permission from the institutional ethical review committee was taken prior to the conduction of the study. All patients were registered in a questionnaire. Brief history of duration of diabetes, family history of diabetes, hypertension, and smoking status was taken.

ABI was determined by a senior medical resident (year 2 or more) with a portable mini Doppler device used as the distal sensor at dorsalis pedis and posterior tibial arteries. The brachial systolic blood pressure was measured in both arms. ABI was calculated by dividing the higher reading of the ankle pressure at dorsalis pedis or posterior tibial artery, by the brachial systolic pressure. If there was a difference of more than 10mmHg in between both brachial pressures then a mean was taken out and then was used for ABI. ABI $\leq$ 0.9 will be chosen as the cut off value for PAD and was defined as low.

Data Analysis: Data was analyzed on SPSS version 13, frequency and percentages were used to present gender, hypertension, smoking status, family history of diabetes and PAD. Mean and standard deviation were used for age and duration of diabetes. Effect modifiers will be controlled through stratification of age, gender, hypertension, duration of diabetes and smoking status. Age, number of males and females, number of hypertensives and duration of diabetes will be quantitative variables. Chi square test was used to compare relative frequencies. P value of less than 0.05 will be taken as significant.

RESULTS

Total of 125 patients were enrolled in the study. Minimum age of the patients was 41 years while maximum age was 70 years. Mean age was 57.10 $\pm$ 8.77 years. Age distribution showed that out of 125 patients, 34 (27.2%) were in the age range of 41-50 years, 37 (29.6%) were between 51-60 years,44 were in the range of 61 -70 years.

There was a female dominance seen, 68 (54.4%) were females. Out of 125 diabetic subjects, 59.20% had peripheral artery disease and 40.80% did not have PAD. Mean duration of diabetes was found to be 4.62 $\pm$ 2.21 years. Minimum duration of diabetes was 2 years while maximum was of 12 years.

Out of 125 patients 87 (69.6%) were hypertensives, 64 (51.2%) were smokers, 102(81.6%) had a family history of diabetes, 74 (59.2%) had peripheral artery disease.

Stratification of age group showed frequency of PAD was higher among the age range of 61-70 years. Out of 74 patients having PAD 45 (83.3%) (p=0.001) were in the age range of 61-70 years while 13 (38.2%) and 16 (43.2%) were in the age range of 41-50 years and 51-60 years respectively.PAD was seen significantly with an increasing age (p=0.001).

Stratification of hypertension showed, 87/125 had hypertension. 63/87 (72.4%) had PAD. Stratification of gender showed that 31 (54.4%) male patients had PAD while 43 (63.2%) females had PAD, with an overall female predominance (p=0.316). Gender was not significantly associated with PAD.

Frequency of PAD was 49 (76.6%) in patients with > 4years duration of diabetes while in 25 (41%) the duration of diabetes was $\leq$ 4years (Table-1). Increased duration of diabetes was significantly associated with increasing PAD (p-0.001).

Stratification of smoking status showed that those patients with or without PAD were similar in patients who were smokers.

Table No.1: Peripheral artery disease and duration of diabetes

Duration of Diabetes (years)	Peripheral Artery Disease		Total (n=125)	p Value
	Present	Absent		
$\leq$ 4	25 (41%)	36 (59%)	61	0.001
> 4	49 (76.6%)	15 (23.4%)	64	
Total	74 (59.2%)	51 (40.8%)	125	

Note: Increased duration of diabetes was significantly (p=0.001) associated with increasing PAD.

DISCUSSION

PAD in patients with diabetes has become an increasingly significant public health concern in both the developed and developing world. Epidemiologic evidence suggests a strong association between diabetics and increase prevalence of PAD. Individuals with diabetes have a two to four fold increase in PAD rates[14]. It has been estimated that PAD is present in 15% of patients with diabetes 10 years after the initial diagnosis.[15]The true prevalence of PAD in people with diabetes has been difficult to determine, as most patients are symptomatic and many do not report their symptoms.[16]

This study focused on detecting PAD in diabetic subject and found that 59.20% had PAD. It was higher than 39.28% reported by Zeeshan et al.[17] from Pakistan, 12.3% reported from Taiwan and 20.0% from United states of America, while being almost equal 61.4% reported from Saudi Arabia.[18-20] This difference in prevalence of PAD could be due to different methods of sampling, variation in sample size, different risk factors stratification. The variation on ethnicity and gender

could also be one possibility, for the difference in prevalence of PAD in diabetic subjects. A multicenter trial at eight centers throughout Pakistan included 830 patients out of which 262 (31.6%) had PAD[21] which is lower than that found in our study. Rehan et al.[22] studied 350 cases of acute coronary syndrome out of which 62 (17.7%) had PAD, while diabetes was found in 34% patients, and PAD was significantly higher 24.16% in diabetics as compared to 14.3% in the non-diabetics.[22] A study conducted on 67 diabetic foot patients showed 44.77% had an evidence of PAD.[23]This difference reflects the increasing prevalence of PAD in diabetic patients due to lifestyle changes such as eating habits, eating out accompanied with a decreasing physical activity seen commonly in our society.

In this study females were more 68 (54.4%) than males 57 (45.6%) and females had a higher frequency of PAD 43 (63.2%) as compared to males 31 (54.4%) but the difference was not statistically significant. Similarly seen in a study conducted by Zeeshan et al. showing females with a higher frequency of PAD then males, in all age groups.[17] These results were consistent with other published studies,[24] while a higher frequency of PAD in men has also been reported.[14,25]

Mean age in our study was 57.10 $\pm$ 8.77 years. Minimum age in our study was 41 years while maximum was 70 years. Frequency of PAD was higher (83.3%) in in 61-70 years age group. This was similar to the study of American college of cardiology/American heart association (ACC/AHA) guidelines for PAD. This study further showed risk factors for PAD can increase in patients with 50-69 years of age, with a history of smoking/diabetes.[26] An American survey of 2174 patients older than 40 years, showed a PAD prevalence of 0.9% between the ages 40-49 years, 2.5% between the ages 50-59 years, 4.7% between the ages of 60-69 years, and 14.5% for the ages of 70 years and older.[27]

In our study 87 (69.6%) were hypertensives, 64 (51.2%) were smokers, 102 (81.6%) had a family history of diabetes. Hypertension is associated with lower extremity PAD, although the association is generally weaker than that with cerebrovascular accident and coronary artery disease.[28]Our study revealed significant association between hypertension and PAD. Out of 87 (69.6%) hypertensives 63 (85%) had PAD, which is similar to a study conducted by Zeeshanet al.[17]

Smoking is one of the highest risk factors for vascular atherosclerosis including PAD. In this study, smoking status showed that patients with or without PAF were similar in patients who were smokers. Similar results have been reported by Zeeshanet al.[17] from Pakistan. Increasing age and duration of diabetes are important risk factors for PAD and our study showed statistically significant association with these variables.

Given the very high prevalence of PAD found in diabetic patients, and the morbidity and mortality associated with PAD, it is assumed that better public and health professional awareness would help to reduce the devastating effects of PAD. Effective treatment and monitoring of diabetes, hyperlipidaemia and hypertension along with increasing physical activity, smoking cessation, may be effective strategies. They may reduce cerebrovascular and cardiovascular morbidity and mortality.

CONCLUSION

A high frequency of PAD was detected in the diabetic subjects with a female pre-ponderance, with statistically significant association with increasing age, hypertension and duration of diabetes.

REFERENCES

1. Basit A, Hydrie MZ, Hakeem R, Ahmedani MY, Masood Q. Frequency of chronic complications of type 2 diabetes. J Coll Physicians Surg Pak 2004; 14(2):79-83.
2. Hashim R, Khan FA, Khan DA, Shaukat A. Prevalence of macrovascularcomplication in diabetes of Wah, District Rawalpindi. J Pak Med Assoc 1999;49: 8-11.
3. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of Diabetes: estimates for the year 2000 and projection for 2030. Diabetes Care 2004;(5):1047-53.
4. Shera AS, Rafique G, Khwaja IA, Ara J, Baqai S, King H. Pakistan National diabetes survey: prevalence of glucose intolerance and associated factors in Shikarpur, Sindh province. Diabet Med 1995;12(12): 1116-21.
5. Shera AS, Rafique G, Khwaja IA, Baqai S, Khan IA, King H. Pakistan National diabetes survey: prevalence of glucose intolerance and associated factors in North West Frontier Province (NWFP) of Pakistan. J Pak Med Assoc 1999;49(9): 206-11.
6. Shera AS, Rafique G, Khawaja IA, Baqai S, King H. Pakistan national diabetes survey: prevalence of glucose intolerance in Baluchistan province. Diabetes Res Clin Pract 1999;(1):49-58.
7. Shera AS, Jawad F, Maqsood A. Prevalence of diabetes in Pakistan. Diabetes Res and Clin Prac 2007;76(2): 219-22.
8. Shera AS, Jawad F, Maqsood A, Jamal S, Azfar M, Ahmed U. Prevalence of chronic complications and associated factors in type 2 diabetes. J Pak Med Assoc 2004;54(2): 54-9.
9. Resnick HE, Lindsay RS, McDermott MM, Devereux RB, Jones KL, Fabsitz RR, et al. Relationship of high and low ankle brachial index to all cause and cardiovascular disease mortality:

the strong heart study. Circulation 2004;109(6): 733-39.
10. Donohoe ME, Fletton JA, Hook A, Powell R, Robinson I, Stead JW, et al. Improving foot care for people with mellitus: a randomized controlled trial of an integrated care approach. Diabet Med 2000;17:581-7.
11. Drouet L. Atherothrombosis as a systemic disease. Cerbrovasc Dis 2002;13 Suppl 1:1-6.
12. Norgren L, Hiatt WR, Dormandy JA, Nehler MR, Harris KA, Fowkes FG. TASC II Working Group. Inter-society consensus for the management of peripheral artery disease (TASC II). Eur J Vasc Endovasc Surg 2007;33 Suppl 1: S1-75.
13. World Health Organization. Steps sample size calculator and sampling spread sheet. WHO 2013. Available from: URL: http://www.who.int/chp/steps/resources/sampling/en/ accessed on 28th Nov 2013.
14. Newman AB, Siscovick DS, Manolio TA, Polak J, Fried LP, Borhani NO, et al. Ankle arm index as a marker of atherosclerosis in cardiovascular health study. Cardiovascular heart study (CHS) collaborative research group. Circulation 1993;88: 837-45.
15. Hittel N, Donnelly R. Treating peripheral artery diseases in patients with diabetes. Diabetes Obes Metabol 2002;49: S26-S31.
16. Elhadd TA, Robb R, Jung RT, Stonebridge PA, Belch JJF. Pilot study of prevalence of asymptomatic peripheral artery occlusive disease in patients with diabetes attending a hospital clinic. Pract Diabetes Int 1999; 16: 163-6.
17. Ali Z, Ahmed SM, Bhutto AR, Chaudhry A, Munir SM. Peripheral artery disease in Type 2 Diabetes. JCPSP 2012; 22(11): 686-89.
18. Fu CC, Chang BS, Pei D, Kuo SW, Lee YC, Li JC, et al. Prevalence, risk factors and associated cardiovascular complications of peripheral artery disease in type 2 diabetic patients in Eastern Taiwan. Tzu Chi Med J 2006; 18: 275-82.
19. Murabito JM, D'Agostino RB, Silbershatz H, Wilson WF. Intermittent claudication: a risk profile from the Framingham heart study. Circulation 1997; 96: 44-9.
20. Al Zahrani HA, Al Bar HM, Bahnassi A, Abdulaal AA. The distribution of peripheral artery disease in a defined population of elderly high-risk Saudi patients. Int Angio 1997; 16: 123-8.
21. Akram J, Aamir AU, Basit A, Qureshi MS, Mehmood T, Shahid SK, et al. Prevalence of Peripheral artery disease in type 2 diabetics in Pakistan. J Pak Med Assoc 2011; 61: 644-8.
22. Siddiqi RO, Paracha MI, Hammad M. Frequency of peripheral artery disease in patients presenting with acute coronary syndrome at a tertiary care center in Karachi. J Pak Med Assoc 2010;60:171-4.
23. Ansari S, Memon IA, Shaikh NA, Memon KI. Frequency of peripheral artery disease in diabetic foot. JLUMHS 2009;8:192-5.
24. Sigvant B, Wiberg-Hedman K, Bergqvist D, Rolandsson O, Andersson B, Persson E, et al. A population-based study of peripheral artery disease prevalence with special focus on critical limb ischaemia and sex differences. J Vasc Surg 2007; 45:1185-91.
25. Lamina C, Meisinger C, Heid IM, Löwel H, Rantner B, Koenig W, et al. Kora Study Group. Association of ankle-brachial index and plaques in the carotid and femoral arteries with cardiovascular events and total mortality in a population-based study with 13 years of follow-up. Eur Heart J 2006; 27:2580-7.
26. Dhaliwal G, Mukherjee D. Peripheral arterial disease: Epidemiology, natural history, diagnosis and treatment. Int J Angiol 2007 Summer;16 (2): 36-44.
27. Selvin E, Erlinger TP. Prevalence of and risk factors for peripheral arterial disease in the United States: results from the National Health and Nutrition Examination Survey, 1999-2000. Circulation 2004;110 (6):738-43.
28. Hooi JD, Stoffers HE, Kester AD, Rinkens PE, Kaiser V, van Ree JW, et al. Risk factors and cardiovascular diseases associated with asymptomatic peripheral arterial occlusive disease. The Limburg PAOD study. Peripheral arterial occlusive disease. Scand J Prim Health Care 1998; 16: 177-82.

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